

A MONOGRAPH OF THE GENUS MENTZELIA¹

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HISTORY

The genus *Mentzelia*, named for Christian Mentzel, a German botanist of the early seventeenth century, was first described by Plumier² in 1703 from a plant collected by him in the West Indies (1689-91). The specimen on which the generic description was based was given the scientific name, *Mentzelia aspera*, by Linnaeus³ in 'Species Plantarum,' 1753, and constitutes the type species for the genus. Willdenow,⁴ in 1799, added one new species, namely, *hispida*. In 1804 a new family, Loasaceae, was described by Jussieu,⁵ based on the two genera, *Mentzelia* and *Loasa*. Previous to this date, these two genera had been included by the majority of botanists in the *Onagraceae*.

A new genus, *Bartonia*, closely related to *Mentzelia*, was published by Sims,⁶ in 1812, from plants sent by Thomas Nuttall⁷ from western North America. The communication, including the description of one species, *decapetala*, was made by Pursh.⁸ A new species, *Mentzelia oligosperma*, was listed in Fraser's Catalogue⁹ in 1813, a detailed description appearing two years later.¹⁰

¹ An investigation carried out at the Missouri Botanical Garden in the Graduate Laboratory of the Henry Shaw School of Botany of Washington University and submitted as a thesis in partial fulfillment of the requirements for the degree of doctor of philosophy in the Henry Shaw School of Botany of Washington University.

² Plumier, C., Nov. Pl. Am. Gen. 40. 1703.

³ Linnaeus, C., Sp. Pl. ed. 1. 516. 1753.

⁴ Willdenow, C. L., Sp. Pl. 2²: 1175. 1799.

⁵ Jussieu, A., Ann. Mus. Nat. Hist. 5: 18. 1804.

⁶ Sims, J., in Bot. Mag. pl. 1487. 1812.

⁷ Nuttall, T., Gen. 1: 297. 1818.

⁸ Pursh, F., Fl. Am. Sept. 1: 327. 1814, as *B. ornata*.

⁹ Fraser, Cat. Pl. 1813 [reprinted in Pittonia 2: 116. 1890].

¹⁰ Nuttall, T., in Sims, Bot. Mag. 42: pl. 1760. 1815.

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Though the genus *Bartonia* Sims was retained for a number of years as a valid genus of the *Loasaceae* and various new species described under it, the generic name *Bartonia* was first used by Willdenow¹¹ in 1801 for a plant belonging to the *Gentianaceae*.

A great deal of confusion arose concerning the correct authority for two species published as *Bartonia ornata* and *B. nuda* Pursh. They were described first by Pursh,¹² in 1814, from plants collected by Nuttall in the region of the upper Missouri. Later, Nuttall¹³ described the same two species as new in 1818. Various persons have listed these two species, *ornata* and *nuda*, as belonging to either Nuttall or Pursh. Rafinesque,¹⁴ aware that *Bartonia* had been used earlier to designate a group of plants in another family, proposed the name *Nuttallia* for that of the previously used *Bartonia*. The generic name was not taken up as a valid genus until a number of years later.

The first Mexican and South American species of *Mentzelia* to be described were *strigosa* and *scabra*, in 1823, from collections made by Humboldt and Bonpland.¹⁵ When De Candolle's 'Prodromus' appeared in 1828,¹⁶ six species of *Mentzelia*, including a new one from Mexico, *stipitata*, and two species of *Bartonia* were given.

A new generic segregate, *Acrolasia*, was proposed in 1835, by Presl,¹⁷ with one species, *bartonioides*. In Don's¹⁸ taxonomic treatment of the genus, 1834, the two genera *Mentzelia* and *Bartonia* were maintained with a total of fourteen species. Spach,¹⁹ in 1838, recognized the three genera, *Acrolasia* Presl, *Bartonia* Pursh, and *Mentzelia* L., and placed them under Section 1. *Bartonineae* of the family *Loasaceae*.

¹¹ Willdenow, C. L., Ges. Naturf. Freunde Berlin, Neue Schrift, 3: 444-445. 1801.

¹² Pursh, F., Fl. Am. Sept. 1: 327, 328. 1814.

¹³ Nuttall, T., Gen. 1: 299. 1818.

¹⁴ Rafinesque, C., in Am. Month. 175. 1818

¹⁵ Humboldt, Bonpland & Kunth, Nov. Gen. & Sp. 6: 95-96. 1823.

¹⁶ De Candolle, A. P., Prodr. 3: 343. 1828.

¹⁷ Presl, K. B., Reliq. Haenk. 2: 39, pl. 55. 1835.

¹⁸ Don, G., Hist. Dichl. Pl. 3: 65. 1834.

¹⁹ Spach, E., Hist. Nat. Veg. 6: 236-240. 1838.

Two other generic segregates, *Creolobus*²⁰ in 1839 and *Chrysostoma*²¹ in 1840, were published by Lilja and almost immediately reduced to synonymy under *Mentzelia*.

In 1834, Hooker,²² in going over the Douglas manuscript, found three new species which he published, namely, *laevicaulis*, *parviflora*, and *albicaulis*, under *Bartonia*. Douglas was uncertain whether or not *albicaulis* should belong to *Bartonia* or to *Mentzelia*. In 1840 Torrey and Gray²³ gave the first comprehensive treatment of the group of North American species. The generic name of *Mentzelia* was retained and *Acrolasia*, *Bartonia*, and a new generic segregate of Nuttall, *Trachyphytum*, were all reduced to synonymy. At this time twelve species were given, including five new ones under three sections, *Eumentzelia*, *Trachyphytum*, and *Bartonia* of Nuttall, not Willdenow.

In 1840 Eaton and Wright²⁴ published the name *Toutereia* and referred to it two species, *ornata* and *nuda*. These names were soon reduced to synonymy under *Mentzelia*. Three years later, Walpers²⁵ recognized *Acrolasia*, *Bartonia*, and *Mentzelia*, as genera of equal rank; and under the latter he indicated three sections, *Eumentzelia*, *Trachyphytum*, and *Microsperma*, together including ten species. Two new South American species *Mentzelia chilensis* and *Acrolasia Solierii*, were added by Gay²⁶ in 1846. The following year Hooker²⁷ listed five species, including a new one, *micrantha*, together with a great deal of synonymy.

The next few years, following various explorations, chiefly in the Southwest, resulted in the publication of several heretofore undescribed species. In 1850, Gray²⁸ definitely placed *Microsperma* as a synonym under *Eucnide*, removing it from

²⁰ Lilja, N., Fl. öfver Sver. odl. Vext. 67. 1839.

²¹ Lilja, N., Fl. öfver Sver. odl. Vext. Suppl. 1: 33. 1840.

²² Hooker, W. J., Fl. Bor. Am. 1: 221-222. [1834] 1840.

²³ Torrey, J. and Gray, A., Fl. N. Am. 1: 534-537. 1840.

²⁴ Eaton, A. and Wright, J., N. Am. Bot. 454. 1840.

²⁵ Walpers, G. G., Rep. Bot. Syst 2: 224. 1843.

²⁶ Gay, C., Fl. Chile 2: 431. 1846.

²⁷ Hooker, W. J., Lond. Jour. Bot. 6: 226. 1847.

²⁸ Gray, A., Boston Jour. Nat. Hist. [Pl. Lindheimeri, pt. 2] 6: 191. 1850.

Mentzelia, with which it had been confused. The period from 1876 to 1900 added a number of new species. Urban and Gilg's²⁹ monographic treatment of the *Loasaceae* appeared in 1900. Seven sections, some of them new, were maintained under the genus *Mentzelia*, comprising in all forty-seven species of North and South America, fourteen of the group newly described.

Cockerell, in 1901,³⁰ added another generic segregate, *Hesperaster*, transferring thereto several species from *Mentzelia*. The following year Osterhout³¹ described two new species under the generic name *Hesperaster*. Rydberg³² revised the genus *Mentzelia*, maintaining *Acrolasia* and *Touthera* and adding a new genus, *Bicuspidaria*, all of which were given equal generic rank with *Mentzelia*.

Nuttallia of Rafinesque was reinstated as a good genus in 1906 by Dr. Greene.³³ The same year Davidson³⁴ made an incomplete revision of some of the western species of *Mentzelia*. This was followed a few years later by an excellent treatment of the section *Trachyphytum* by Macbride.³⁵

Since the publication of Urban and Gilg's monograph in 1900, several species have been published as new to science. The five genera, *Acrolasia*, *Nuttallia*, *Touthera*, *Bicuspidaria*, and *Mentzelia*, have been kept as valid genera by certain authorities, especially in some of the manuals and local floras.

It has been the aim of the writer to bring together as completely as possible all the historical data relating to the genus, as well as the results of a critical study of recent collections, thereby clarifying synonymy and also establishing the natural relationships of the various entities concerned.

The writer is indebted to Dr. George T. Moore, Director of the Missouri Botanical Garden, where this study was under-

²⁹ Urban, I. & Gilg, E., *Monographia Loasacearum*. Nov. Act. Nat. Cur. [Abh. K. Leop.-Carol. Deutsch. Akad. Naturf.] **76**: 22-97, 356-358. 1900.

³⁰ Cockerell, T. D. A., in *Torreyana* **1**: 142. 1901.

³¹ Osterhout, G., in *Bull. Torr. Bot. Club* **29**: 174. 1902.

³² Rydberg, P. A., in *Bull. Torr. Bot. Club*, **30**: 275. 1903.

³³ Greene, E. L., *Leaflets Bot. Obs. & Crit.* **1**: 210. 1906.

³⁴ Davidson, A., in *Bull. So. Calif. Acad. Sci.* **5**: 14. 1906.

³⁵ Macbride, J. F., in *Contr. Gray Herb. N. S.* **56**: 24-28. 1918.

taken, for the privilege of using the library and herbarium. She extends especial thanks and appreciation to Dr. J. M. Greenman for his kindly interest and supervision throughout the preparation of this monograph. The writer also wishes to thank Dr. Roland V. La Garde and Mr. Ward M. Sharp for the photographs taken in connection with the illustrations used in this paper. Grateful appreciation is extended to those in charge of the following herbaria for the generous loans of material necessary for this study: the United States National Museum; the Field Museum of Natural History; Kew Herbarium; the Natural History Museum of Vienna; the California Academy of Sciences; University of California Herbarium; the Dudley Herbarium of Leland Stanford Jr. University; the Academy of Natural Sciences of Philadelphia; Pomona College Herbarium; the Rocky Mountain Herbarium, University of Wyoming; Frank W. Peirson Herbarium; University of Michigan Herbarium; University of Arizona Herbarium; University of Montana Herbarium.

ABBREVIATIONS

The following abbreviations have been used in citations to indicate the different herbaria from which material has been obtained for study:

- A = University of Arizona Herbarium.
- ANSP = The Academy of Natural Sciences of Philadelphia.
- C = University of California.
- CAS = California Academy of Sciences.
- D = Dudley Herbarium of Leland Stanford Jr. University.
- F = Field Museum of Natural History.
- K = Kew Herbarium.
- M = Missouri Botanical Garden.
- MH = University of Michigan Herbarium.
- P = Pomona College.
- PH = Frank W. Peirson Herbarium.
- RM = Rocky Mountain Herbarium, University of Wyoming.

- UM = University of Montana.
US = United States National Museum.
V = Natural History Museum of Vienna.

GENERAL MORPHOLOGY

The genus *Mentzelia* includes annual or perennial, rarely biennial, herbaceous plants, which become ligneous or often suffruticose. The latter condition is characteristic of a few species of the *Eumentzelia* section.

Roots.—The annuals have a small tap-root with small lateral roots. The perennial species usually have a strong woody root, rarely a creeping rootstalk, more or less fusiform or thickened.

Stems.—The stems are erect or decumbent at the base, simple or branched below, few to several, often caespitose. The annuals assume a slender appearance, whereas the perennials are ordinarily stouter, coarser, and large. The stem may be glabrous, especially the older parts, or with varying degrees of hirsute pubescence. The bark or outer epidermis often appears shining white, breaking and disintegrating readily. The white stems are characteristic of a number of species, especially in the section *Trachyphytum* and occasionally in the *Bartonia* group.

Leaves.—The leaves are usually alternate, rarely subopposite and decussate as in *M. aborescens* and a few other members of the *Eumentzelia* section. The leaf shapes vary greatly, even on the same plant. The leaves are mostly sessile in the *Trachyphytum*, *Bicuspidaria*, and *Bartonia* sections, rarely petiolate, variously lobed, pinnatifid or entire.

The degree of pubescence varies on the two surfaces of the leaf; usually the pubescence is greater on the lower surface and veins. The young leaves are somewhat more pubescent than others. Petioles, if present, are usually short and pubescent, rarely glabrous.

Pubescence.—The peculiar hairs present in *Mentzelia* in many cases furnish an excellent basis for specific differentiation. The hairs are of three general types, namely, tapering

spine-like hairs, Chinese pagoda-like hairs, which are broad at the base and referred to as glochidiate hairs, and those with tuberculate "stem" and harpoon top, or with a smooth stem and harpoon top. The usual form is the glochidiate type, of varying lengths, often appressed, especially on the leaves and stem.

Where abundant moisture is available the pubescence is scattered. In the more arid localities it is more copious and denser, with a reduction of leaf surface.

Inflorescence.—The inflorescence is terminal, cymose, one to many-flowered, often subtended by ovate deltoid lanceolate linear subulate bracts, which are simple, entire, or variously lobed or pinnatifid, and pubescent as on the leaves. The subtending bracts are usually green in color, though they may become membranous or scarious as in *M. involucrata* and *M. congesta*. The flowers are perfect, regular, and five-parted.

Calyx.—The calyx is five-parted, obtuse, ovate, acute, lanceolate, or long-acuminate, becoming subulate, frequently ciliate on the margins, with prominent veins of one to three. The inner surface is slightly villous, the outer surface variously pubescent, affording with other characters a basis for specific delimitation.

Corolla.—The color of the petals varies from almost white to greenish-yellow and deep orange. Occasionally a deeper color appears at the very base of the petal. A vermilion spot occurs at the base of the petal in *M. Lindleyi* and closely allied species. The petals may be connate, obovate, oblong-obovate, acute, or apiculate at the apex, rarely emarginate, narrowed at the base into a claw, and glabrous or pubescent.

Stamens.—The stamens present a valuable specific character. The filaments are linear or petaloid, the outer row often sterile, seldom antheriferous if assuming a petaloid form, bicuspidate at apex in the section *Bicuspidaria*. The stamens may be few, small, and all linear as in most of the *Trachyphytum* group, or numerous and either all linear or the outer row petaloid as in *Bartonia*.

Hypanthium.—The hypanthium is three-celled, opening by

valves at the summit, rarely splitting longitudinally, with or without persistent calyx-lobes, pubescent in varying degrees, sessile or pedicellate.

Fruit.—The fruit of *Mentzelia* is a capsule with few to numerous seeds, with or without lamellae.

Seeds.—The seeds are winged, margined, or marginless. The shape and markings of the seeds have furnished constant dependable characters for separating species and a secondary sectional character.

GENERIC RELATIONSHIPS

The genus *Mentzelia* is placed in the Mentzelioideae tribe of the Loasaceae, together with two other genera, namely, *Eucnide* and *Sympetaleia*, because of the number of stamens ranging from ten to indefinite and because of the absence of nectary-producing squamellae. *Mentzelia* is the only genus representing the subtribe Mentzelieae distinguished by the three parietal placentae and the ovules appearing in one or two series on each placenta. In the subtribe Eucnideae, which includes the two genera *Eucnide* and *Sympetaleia*, the ovules are in numerous series on each placenta.

The petals in the genus *Mentzelia* are free, whereas in *Eucnide* they are connate and in *Sympetaleia* they form an elongated tube with the filaments adnate to the tube. Stinging hairs are present in *Eucnide* and absent in *Mentzelia*. *Eucnide* and *Mentzelia* have two-celled anthers distinguishing them from *Sympetaleia*, which has one-celled anthers.

GEOGRAPHICAL DISTRIBUTION AND PHYLOGENY

The genus *Mentzelia* is a group of mesophytic and xerophytic plants having a distribution chiefly in western America. With the exception of *M. floridana* and *M. aspera* the genus extends from central United States to the Pacific coast, and from adjacent Canada south to Argentina, South America. *Mentzelia floridana* is found in Florida and the Bahama Islands and is closely related to *M. Lindheimeri* in Texas and Mexico. The species *M. aspera* has the most widespread distribution of the

entire group, occurring in the subtropical regions of the West Indies and from southern Arizona southward to Argentina.

The species of the *Eumentzelia* section present a homogeneous group of more or less closely related forms. The plants comprising the *Eumentzelia* and *Bartonia* sections, on account of the frequently perennial habit and prevailing undivided leaves, probably represent the more primitive characters of the genus and are thought to have originated from a suffrutescent or arborescent ancestor which had its distribution in Mexico. The *Eumentzelia* section is mostly distributed in Mexico and Lower California southward into South America, with four species, *aspera*, *asperula*, *oligosperma*, and *floridana*, occurring within the boundaries of the United States. The *Bartonia* group is represented in South America by a single species which is also indigenous to Texas, Oklahoma, and Mexico. The group is generally distributed throughout the plains states, Rocky Mountains, and Pacific Coast regions.

The annuals constitute the two sections, *Trachyphytum* and *Bicuspidaria*, and represent the more advanced forms of *Mentzelia*. It is within these two groups that the greatest variation in leaf and flower structure is manifest. The *Bicuspidaria* section is represented in southern California, Arizona, Mexico, and Lower California. The species of the section *Trachyphytum* are distributed mostly in the Rocky Mountains and along the Pacific coast from British Columbia to Lower California. Four species of this section occur in South America.

There are apparently two centers of distribution, one in Mexico, and the other in the southwest portion of the United States in the region from New Mexico to southern California.

TAXONOMY

Mentzelia [Plumier] Linn. Sp. Pl. ed. 1. 516. 1753; Gen. Pl. ed. 1. 338, n. 847. 1737, and ed. 5. 233, n. 595. 1754; Hort. Cliff. 492. 1737; Syst. ed. 10. 1076. 1759; Juss. Gen. Pl. 321. 1789; Lunan, Hort. Jam. 1: 504. 1814; HBK. Nov. Gen. & Sp. 6: 119. 1823; Kunth, Syn. Pl. 3: 404. 1824; Torrey & Gray, Fl. N. Am. 1: 532. 1840; DC. Prodr. 3: 343. 1828; G. Don, Hist. Dichl. Pl.

3: 65. 1834; Endl. Gen. 390, No. 5111. 1840; Walp. Rep. Bot. Syst. 5: 776. 1845-46; Brewer & Watson, Bot. Calif. 1: 235. 1876; Baillon, Hist. Pl. 8: 465. 1886; Greene, Fl. Francisc. 232. 1891; Greene, Man. Bot. Reg. San Francisco Bay, 141. 1894; Gilg in Engl. & Prantl, Nat. Pflanzenfam. 3^{6a}: 109. 1894, and ed. 2. 21: 532. 1925; Chapman, Fl. Southeast. U. S. ed. 3. 107. 1897; Howell, Fl. N. W. Am. 1: 239. 1897; Urban & Gilg in Nov. Act. Nat. Cur. [Abh. K. Leop.-Carol. Deutsch. Akad. Naturf.] 76: 22-23. 1900; Small, Fl. Southeast. U. S. 809. 1903; Rydb. Fl. Colo. 234-236. 1906; Piper in Contr. U. S. Nat. Herb. [Fl. Wash.] 11: 436. 1906; Gray, Man. Bot. ed. 7. 588. 1908; Coulter & Nelson, Man. Bot. Rocky Mts. 324. 1909; Britton & Brown, Ill. Fl. ed. 2. 2: 566. 1913; Piper & Beattie, Fl. Southeast. Wash. & Adj. Idaho, 166. 1914; Wootton & Standley in Contr. U. S. Nat. Herb. [Fl. N. Mex.] 19: 436. 1915; Rydb. Fl. Rocky Mts. & Adj. Plains, 574. 1922; Davidson & Moxley, Fl. So. Calif. 239. 1923; Tidestrom in Contr. U. S. Nat. Herb. [Fl. Utah & Nev.] 25: 361. 1925; Jepson, Man. Fl. Pl. Calif. 648. 1925; Fawcett & Rendle, Fl. Jam. 5: 247. 1926; Rydb. Fl. Prairies & Plains Cent. N. Am. 558. 1932.

Mentzelia Plumier, Nov. Pl. Am. Gen. 40, *pl.* 6. 1703; Linn. Gen. Pl. ed. 1. 338, n. 847. 1737; Hort. Cliff. 492. 1737.

Bartonia Sims, in Bot. Mag. *pl.* 1487. 1812.

Nuttallia Raf. in Am. Month. 175. 1818.

Torreya Eaton, Man. Bot. ed. 5. 420-421. 1829, and ed. 6. 367. 1833.

Acrolasia Presl, Reliq. Haenk. 2: 39. 1835.

Creolobus Lilja, Fl. öfver Sver. odl. Vext. 67. 1839.

Microsperma Hook. Ic. Pl. *pl.* 234. 1839.

Chrysostoma Lilja, Fl. öfver Sver. odl. Vext. Suppl. 1: 33. 1840; Linnaea 15: 263. 1841.

Touterea Eaton & Wright, N. Am. Bot. 454. 1840.

Trachyphytum Nutt. ex Torrey & Gray. Fl. N. Am. 1: 533. 1840.

Hesperaster Cockerell in Torreya 1: 142. 1901.

Bicuspidaria Rydb. in Bull. Torr. Bot. Club 30: 275. 1903.

Annual or perennial, rarely biennial herbs, shrubs, or

rarely, trees, erect or trailing, freely branching, covered with various types of rigid tenacious barbed hairs, never stinging. Stems becoming white and shining in most species, scabrous or glabrous. Leaves alternate, rarely opposite, 3-5-lobed, coarsely toothed or pinnatifid, sessile to long-petiolate. Inflorescence terminal, cymose. Flowers 1 to many at apex of branches, sessile or shortly pedicellate, small or large, mostly white, yellowish, golden-yellow or orange, subtended by bracts. Calyx-tube cylindrical to ovoid or turbinate, sessile or pedicellate. Calyx-limb 5-lobed, imbricated, deciduous or persistent and withered in the mature fruit. Petals 5-10, imbricated, free or inconspicuously united at the base, obovate to obovate-oblong, rarely spatulate, narrowed or contracted at base, apiculate at apex, glabrous or pubescent on dorsal surface. Stamens numerous, 10-200, free from the petals but inserted with them on the throat of the calyx; filaments distinct, or in clusters opposite the petals, equal in length or the outer series longer, filiform or linear or the 10 exterior broadened, dilated to spatulate or petal-like, in 1 to 5 series, deciduous, always inflexed or incurved at the apex, rarely the 5 exterior ones sterile. Anthers introrse, bilocular, laterally dehiscent, attached at base or dorsal side. Style elongated, filiform, often twisted, smooth, angled, usually persistent in fruit, apex 3-cleft with usually 3 stigmatic surfaces, papillose. Disk concave, glabrous, or rarely pilose. Ovary unilocular, 2-80 ovules. Ovules anatropous, pendulous or horizontally placed, few to many in 1 or 2 rows on 3, rarely 5-7, filiform to linear, inconspicuous or prominent, smooth or incised, parietal placentae; funicle small or lacking. Fruit a short cylindrical, oblong, or turbinate capsule, sessile or pedicellate, more or less densely ribbed at maturity, pericarp papery to somewhat woody, 3-7-valved or irregularly truncate at apex. Seeds in 1 or 2 series, flat or angled, with or without wings, testa papery or somewhat leathery, opaque or shiny, smooth, punctate or striate. Endosperm copious or scanty to almost lacking. Embryo erect or curved, radicle conic or nearly cylindrical, obtuse or somewhat acute, longer or shorter than the flattish cotyledons.

Type species: *Mentzelia aspera* Linn. Sp. Pl. 516. 1753.

KEY TO THE SECTIONS

- Filaments broadened, cuspidate at apex.....Section IV. BICUSPIDARIA
 Filaments narrowed, not cuspidate at apex.....
 Seeds horizontal.....Section II. BARTONIA
 Seeds pendulous.
 Placenta broad, plicated.....Section I. EUMENTZELIA
 Placenta narrowly filiform.....Section III. TRACHYPHYTUM

SECTION I. EUMENTZELIA Torrey & Gray

Section I. EUMENTZELIA Torrey & Gray, Fl. N. Am. 1: 533. 1840; Walpers, Rep. 2: 224. 1843; Brewer & Watson, Bot. Calif. 1: 235. 1876; Urban & Gilg in Engl. & Prantl, Nat. Pflanzenfam. 3^{6a}: 110. 1894; in Nov. Act. Nat. Cur. [Abh. K. Leop.-Carol. Deutsch. Akad. Naturf.] 76: 41. 1900.

Mostly perennials; the stems, leaves, and capsules hirsute-scabrous with glochidiate and spine-like hairs; leaves sessile or petiolate, serrate-dentate to trilobed; flowers terminal or in the forks of the branches; petals 5, yellow to orange; filaments few to numerous, filiform or the outer 10 slightly broadened or petaloid, all antheriferous; capsule cylindrical to obconical-turbinate, sessile or pedicellate; placentae broad, irregularly plicate-rugose; seeds 1-15, rarely more, in 1 to 2 series, pendulous, striate to densely tuberculate-verrucose, opaque, usually not winged. Spp. 1-20.

KEY TO SPECIES OF SECTION EUMENTZELIA

- A. Leaves alternate.
 B. Calyx-tube and capsule cylindrical, mostly sessile.
 C. Outer stamens petaloid.....19. *M. aspera*
 CC. Outer stamens not petaloid.
 D. Stamens 15 or more.
 E. Perennial; capsule thick-walled, often recurved, few-seeded
 13. *M. oligosperma*
 EE. Annual; capsule thin-walled, straight, several-seeded...18. *M. asperula*
 DD. Stamens 10-1212. *M. parvifolia*
 BB. Calyx-tube and capsule obconical or turbinate, attenuated below into more or less of a pedicel (except in *M. soratensis*).
 C. Stamens equal in size.
 D. Leaves mostly petiolate.
 E. Lower leaves petiolate, upper leaves subsessile.....15. *M. adhaerens*
 EE. Leaves all petiolate.
 F. Capsule sessile or nearly so; petals 7-9 mm. long.....17. *M. texana*

- FF. Capsule strongly pedicellate; petals 10–15 mm. long.
 G. Stamens about 20; pedicel 3 mm. or more long....16. *M. floridana*
 GG. Stamens about 40; pedicel 1–1.5 mm. long....14. *M. Lindheimeri*
 H. Calyx-lobes lanceolate, 10–12 mm. long.....10. *M. chilensis*
 HH. Calyx-lobes linear-lanceolate, 7 mm. long.....
10a. *M. chilensis* var. *atacamensis*
 DD. Leaves sessile.
 CC. Stamens unequal in size.
 D. Leaves sessile.
 E. Leaves deeply incised to subtrilobate.....7. *M. strigosa*
 EE. Leaves ovate to ovate-orbicular, never strongly incised.
 F. Capsule sessile.....11. *M. sessilifolia*
 FF. Capsule pedicellate.
 G. Stamens 40–50, in 2 (rarely 3) series.....9. *M. ignea*
 GG. Stamens 50–60, in 3 series.
 H. Leaves ovate-lanceolate to triangular-lanceolate.....
5. *M. soratensis*
 HH. Leaves ovate6. *M. cordifolia*
 DD. Leaves petiolate (upper leaves subsessile in sp. 8).
 E. Petals 18–20 mm. long.....8. *M. cordobensis*
 EE. Petals 20–32 mm. long.
 F. Petals 20–22 mm. long.....3. *M. Fendleriana*
 FF. Petals 23–32 mm. long.
 G. Stamens 40–80, in 2–3 series.....4. *M. hispida*
 GG. Stamens 100–120, in 4 series.....2. *M. scabra*
 AA. Leaves opposite or subopposite.....1. *M. arborescens*

1. *M. arborescens* Urban & Gilg apud Urb. in Ber. Deut. Bot. Ges. 10: 265. 1892; Gilg in Engl. & Prantl, Nat. Pflanzenfam. 3^{6a}: 110. 1894, and ed. 2. 21: 534. 1925; Urban & Gilg in Nov. Act. Nat. Cur. [Abh. K. Leop.-Carol. Deutsch. Akad. Naturf.] 76: 76. 1900.

M. Conzattii Greenm. in Proc. Am. Acad. 32: 298. 1897.

Tall shrub or small tree with brittle woody stems; stems yellowish, covered with a thin scarious bark, glabrous below, pubescent above on younger parts; lower leaves subopposite, upper more often distinctly alternate, simple, oblong-lanceolate, 4–12 cm. long, 1.5–3.5 cm. broad, acuminate, acute, finely dentate, gradually narrowed at the entire base into a short petiole, scabrous above, tomentose beneath, midrib somewhat depressed above, prominent beneath; petioles 4–12 mm. long; inflorescence cymose-paniculate; flowers pedicellate, showy, bright yellow, about 5 cm. in diameter; calyx-tube turbinate, barbellate-pubescent; calyx-lobes 5, lanceolate-ovate, acumi-

nate, 12–15 mm. long, 4 mm. broad at base, pubescent; petals 5, rarely 6, ovate-oblong, short-acuminate, slightly narrowed at base, 2.5 cm. long, 1–1.5 cm. broad; stamens numerous, in 4 series, disposed in phalanges opposite the petals, the 4 outer filaments of each phalanx flattened and broadened over half their length, the remainder of the filaments filiform and about one-half or two-thirds as long as the outer ones; style single, filiform, somewhat attenuated and 6-angled at the summit; capsule broadly ovate, obtuse at base, yellowish-brown, distinctly striate, with persistent calyx-lobes and style, 3-valved at apex; seeds in 1 or 2 series on the placentae, placed horizontally in the centre of the capsule at maturity, winged.

Distribution: mountainous regions in southern Mexico.

Specimens examined:

MEXICO: Oaxaca, mountains near Tlacotalpan, 6000–8000 ft. alt., 7 Dec. 1894, *Nelson 2089* (US); Oaxaca de Juarez, 1550 m. alt., 19 Dec. 1906, *Conzatti* (ANSP, F, M, US, V); Oaxaca, 1550 m. alt., 10 March 1907, *Conzatti 1758* (US); Pueblo Nuevo, Miahuatlan, 2550 m. alt., 1920, *Conzatti 4094* (US); Juquila, Oaxaca, 1400 m. alt., 12 Dec. 1921, *Conzatti 4359* (US); Oaxaca, 1843, *Galeotti 3682* (K, V).

2. *M. scabra* HBK. Nov. Gen. et Sp. **6**: 120. 1823; DC. Prodr. **3**: 343. 1828; G. Don, Hist. Dichl. Pl. **3**: 66. 1834; Dietrich, Syn. Pl. **3**: 85. 1843; Urban & Gilg in Nov. Act. Nat. Cur. [Abh. K. Leop.-Carol. Deutsch. Akad. Naturf.] **76**: 73. 1900.

Perennial, 4–8 dm. high; stems erect, dark yellow, scabrous with rigid verticillate glochidiate hairs; leaves alternate, ovate, regularly denticulate to crenate, acute, subrotund at the base, upper surface densely covered with short, recurved, tubercular-hispid hairs, dark green, the lower surface densely clothed with short verticillate glochidiate hairs, grayish, lower leaves short but distinctly petiolate, upper usually sessile; flowers sessile in the forks of dichotomous branches; calyx-tube obconical to turbinate, attenuated below, densely covered with long verticillate spine-like hairs; calyx-lobes ovate-oblong to ovate-lanceolate or lanceolate, 13–20 mm. long, persistent in fruit, irregularly reflexed, dark; petals 5, yellow, obovate to broadly obovate, 2–3 cm. long, shortly apiculate, narrowed at the base, dorsal surface with short hairs near the apex, otherwise glabrous; stamens 100–120, in 4 series, the 10 exterior

nearly as long as the petals and broadened, rest filiform or narrowly linear and shorter, more or less coherent at the base; capsule subcylindrical, attenuated below into a pedicel 1.6–1.7 cm. long, grayish, scabrous; seeds 4–6, in 2, rarely 1, series, pendulous, irregularly ovate to ovate-oblong, brown or brownish-black, irregularly striated to densely verrucose-tuberculate, narrowly winged.

Distribution: in mountainous regions of Colombia, Ecuador, and Peru.

Specimens examined:

COLOMBIA: Rio Guaitara, Pasto, 1500–1600 m. alt., *Lehmann 7944* (F, K); Rio Guaitara, between Luquerres and Pasto, 16 May 1876, *Andr  3187* (F, K).

3. *M. Fendleriana* Urban & Gilg in Mem. Torr. Bot. Club 3: 34. 1893.

Perennial; stems erect, white or yellowish-white, scabrous; leaves alternate, lanceolate, regularly dentate or serrate, base subcuneate, apex shortly acuminate; petiole 1.3 cm. long, scabrous, canescent; flowers sessile, disposed in cymes at ends of the branches; calyx-tube obconical or turbinate, attenuated, hirsute; calyx-lobes ovate-lanceolate, 13–14 mm. long, acuminate, pilose, persistent, withered, black, reflexed on the fruit; petals 5, yellow, obovate or obovate-oblong, 2–2.2 cm. long, apiculate, apex pilose; stamens 70–80, in 4 series, the 10 exterior filaments 1.8 cm. long, linear, the inner series filiform and shorter; style filiform, persistent in fruit; capsule obconical or turbinate, attenuated, black, scabrous, shortly pedicellate, pedicel about 1 cm. long; seeds 5–6, pendulous, irregularly ovate-oblong, yellow or grayish-yellow, striate, verrucose-tuberculate.

Distribution: from Venezuela southward along the western coast of South America from Ecuador to Chile.

Specimens examined:

VENEZUELA: near Tovar, 1854–5, *Fendler 1876* (ANSP, M).

ECUADOR: near Pillaro, Prov. Tungurahua, without date, *Pachano 79* (US).

PERU: without definite date or locality, *Wilkes' Exploring Expedition* (US); Huanantango, without date, *Bordeau* (K); Lima, without date, *Cuming 1011* (K); Ollantaytambo, 3000 m. alt., 24 April 1915, *Cook & Gilbert 280* (US); same locality, 4 May 1915, *Cook & Gilbert 545* (US); Uspachaca, 8500 ft. alt., 23 June 1922,

Macbride & Featherstone 1296 (US); Tulara, Prov. Paita, 1925, *Haught* (US); near Urubamba, 3000 m. alt., April 1926, *Herrera 1066* (US); Urubamba Valley, Gucay, 3000 m. alt., Jan. 1927, *Herrera 1366* (US); same locality, July 1927, *Herrera 1529* (US).

BOLIVIA: Bolivian Plateau, 1891, *Bang 748* (ANSP, K, M, US); same locality, *Bang 1082* (ANSP, F, M, US); Parotani, 20 March 1892, *Kuntze* (F); Valley of Chillo, 1500 ft. alt., without date, *Hall 11* (K); Andacollo Valley near Coquimbo, 1000 ft. alt., Sept. 1927, *Elliott 31* (K).

4. *M. hispida* Willd. Sp. Pl. 2²: 1176. 1799; Juss. Ann. Mus. Nat. Hist. 5: 24. 1804; DC. Prodr. 3: 343. 1828; Urban & Gilg in Nov. Act. Nat. Cur. [Abh. K. Leop.-Carol. Deutsch. Akad. Naturf.] 76: 64. 1900.

M. aspera Lam. Ill. pl. 425. 1797; Cav. Ic. 1: 51, pl. 70. 1791.

M. stipitata Mociño & Sesse, Fl. Mex. ex DC. Prodr. 3: 343. 1828; Presl, Reliq. Haenk. 2: 40. 1835.

M. gracilis Urb. & Gilg, l.c. 61. 1900.

M. Palmeriana Urb. & Gilg, l.c. 75.

M. Karwinskii Urb. & Gilg, l.c. 65.

M. imbricata Urb. & Gilg, l.c. 67.

M. polyantha Urb. & Gilg, l.c. 70.

M. Orizabae Urb. & Gilg, l.c. 60.

M. Galeottii Urb. & Gilg, l.c. 69.

M. incisa Urb. & Gilg, l.c. 59.

Annual or perennial from a fusiform root, 5–8 dm. high, striate, brown or brownish-yellow, densely scabrous, especially on younger branches; stems dichotomously branched; leaves alternate, ovate-lanceolate, broadly serrate-dentate to subtrilobate, acuminate at the apex, rotund at the base, rarely subcordate to subcuneate, shortly petiolate, 4–6 cm. long, upper and lower surfaces densely scabrous; flowers at the apex of branches or in the forks of dichotomous branches, orange-yellow; calyx-tube conical, attenuated, hirsute-scabrous; calyx-lobes ovate-lanceolate to lanceolate, long-acuminate, 12–15 mm. long, persistent, withered in fruit, reflexed, brownish-gray; petals 5, obovate or obovate-oblong, abruptly apiculate, 2–3 cm. long, slightly puberulent at the apex, otherwise glabrous; filaments 40–60, in 2–3 series, the exterior 10 filaments longer, linear, inner series filiform and somewhat shorter; style fili-

form, glabrous, angled, papillose at the apex, withered and persistent in fruit; capsule conical, attenuated, brown or brownish-black, scabrous, subchartaceous; seeds 6–10, pendulous, irregularly ovate to ovate-oblong, brownish-gray, irregularly striate to densely tuberculate-verrucose.

Distribution: Mexico.

Specimens examined:

MEXICO: indefinite locality, without date, *Wawra* 304 (V); *Uhde* 1073 (US); Valley of Mexico, *Schenitz* (V); Valley of Mexico, *Schaffner* 160 or 169 (K); indefinite locality, without date, *Orcutt* 4420 (K); Chapultepec, *Knechtel* 757 (V); Pahuan, *Ehrenberg* 202 (US); Orizaba, State of Vera Cruz, *Botteri* 558 (US); same locality, *Botteri* 769 (K); without definite locality, 1839, *Berlandier* 654 (M, V); Aguas Calientes, Zacatecas, 1839, *Hartweg* 16 (K, V); Oaxaca, Nov.–April 1840, *Galeotti* 3683 (V); Tehuacan, Oaxaca, 5000 ft. alt., Aug. 1840, *Galeotti* 3681 (V); Oaxaca, 1842, *Liebmam* 94 (US); Toluca, 1846, *Heller* (V); Montevideo, 1852, *Hooker* (K); Orizaba, 1853, *Müller* 1088 (V); Valley of Mexico, Mt. Zacoalco, 5 July–12 Aug. 1865, *Bourgeau* 295 (K, M); Cakoboya, 12 Aug. 1867, *Bilimek* 270 (US); indefinite locality, 1868, *Hahn* 29 (M); San Luis Potosi, 1876, *Schaffner* 110 (US); region of San Luis Potosi, 6000–8000 ft. alt., 1878, *Parry & Palmer* 257 (ANSP, M, US); Soledad, 25 miles southwest from Monclova, Coahuila, 9–19 Sept. 1880, *Palmer* 353 (ANSP, US); Caracol Mts., 1880, *Palmer* 357 (US); Saltillo, 1898, *Palmer* 352 (ANSP, C, M, US); Santa Eulalia Mts., Chihuahua, 19 Sept. 1885, *Pringle* 616 (ANSP, F, US); Rio Blanco, State of Jalisco, June–Oct. 1886, *Palmer* 600 (ANSP, US); near Domingillo, 4500–5500 ft. alt., 30 Oct. 1894, *Nelson* 1837 (US); same locality, 3 Oct. 1894, *Nelson* 1592 (US); Durango, April–Nov. 1896, *Palmer* 485 (F, M, US); Puebla, 1900, *Nicolas & Arsène* 35 (F); near Tehuacan, State of Puebla, 1–2 Aug. 1901, *Rose & Hay* 5876 (US); hills near El Salto, Hidalgo, 7500 ft. alt., 15 Sept. 1902, *Pringle* 9802 (F, M, US); near Aguas Calientes, 9 Oct. 1903, *Rose & Painter* 7734 (US); near El Salto, Hidalgo, 16 Sept. 1903, *Rose & Painter* 7071 (US); Ixmiquilpan, Hidalgo, Aug. 1905, *Purpus* (C); between San Pablo and Cuderoztla, State of Queretaro, 25 Aug. 1905, *Rose, Painter & Rose* 9831 (US); near Tlalpam, Valley of Mexico, 1905, *Rose, Painter & Rose* 9444 (US); near San Juan del Rio, State of Queretaro, 18 Aug. 1905, *Rose, Painter & Rose* 9595 (US); Del Cierro a In. Juan, State of Queretaro, 27 Aug. 1905, *Altamirano* (US); Cerro San Antonio, Oaxaca, 1700 m. alt., 28 Oct. 1906, *Conzatti* 1590 (US); same locality, 1600 m. alt., 12 Oct. 1907, *Conzatti* 2035 (F); Morelia, 2000 m. alt., 6 Sept. 1909, *Arsène* 47 (F); Churubusco, 4 Oct. 1910, *Orcutt* 4296 (F, M); Tlalpam, 16 Aug. 1910, *Orcutt* 3622 (F, K, M, US); Minas de San Rafael, San Luis Potosi, Nov. 1910, *Purpus* 4892 (C); Puebla, 1910, *Arsène* 35 (F); Cerro San Miguel, near Morelia, State of Michoacan, 15 Sept. 1910, *Arsène* 5203 (US); near Morelia, State of Michoacan, 1910, *Arsène* 5338 (K, M, US); Rincon, near Morelia, State of Michoacan, 1900 m. alt., 8 Sept. 1910, *Arsène* 5288 (M, US); Acueducto Hercules, Queretaro, 1912, *Arsène* 10609 (US); Buena Vista, State of Tamaulipas, 18 June 1919, *Wooton* (US); Tamps, 9000 m. alt., 8 April 1926, *Runyon* 997 (US).

5. **M. soratensis** Urban & Gilg in Nov. Act. Nat. Cur. [Abh. K. Leop.-Carol. Deutsch. Akad. Naturf.] **76**: 68. 1900.

Perennial; stems erect, brown, terete, striated, scabrous, branching above; leaves alternate, sessile, ovate-lanceolate to triangular-lanceolate, 3–3.5 cm. long, dentate or serrate, scabrous, base rotund, apex short-acuminate; flowers sessile, disposed in cymes at the ends of branches; calyx-tube obconical or turbinate, attenuated but not pedicellate, 4–5 mm. long; calyx-lobes ovate, acuminate, 10–12 mm. long, persistent, withered, black; petals 5, obovate to obovate-oblong, 1.8–2 cm. long, apex pilose, apiculate; stamens 50–60, in about 3 series, the 10 exterior filaments 1.5–1.7 cm. long, linear, the inner series filiform, less than 1 cm. in length; capsule obconical or turbinate, black, scabrous, 1.3–1.5 cm. long, attenuated toward the base into a very short pedicel; seeds 4–6, pendulous, irregularly ovate to ovate-oblong, gray or grayish-yellow, irregularly striate to tuberculate-verrucose.

Distribution: Ecuador, Peru and Bolivia.

Specimens examined:

ECUADOR: vicinity of Huigra, 18 Aug. 1918, *Rose & Rose 22198* (US); Huigra, Prov. Chimborazo, 3 Aug. 1920, *Holway & Holway 819* (US); same locality, 1200 m. alt., 4–27 July 1923, *Hitchcock 40317* (US).

PERU: rocky cliffs, Tiabaya, Dept. Arequipa, 2000 m. alt., 1925, *Pennell 13069* (ANSP).

BOLIVIA: Prov. Larecaja, 2650 m. alt., May–Dec. 1857, *Mandon 621* (V); Sorata, 17 April 1920, *Holway & Holway 540* (US).

6. **M. cordifolia** Dombey ex Urban & Gilg in Nov. Act. Nat. Cur. [Abh. K. Leop.-Carol. Deutsch. Akad. Naturf.] **76**: 74. 1900.

Perennial branched spreading shrub with erect brown or yellowish-brown stems, densely covered with verticillate glochidiate and a few spine-like hairs, branches ascending; leaves alternate, sessile, ovate, 3–6 cm. long, dentate to serrate, incised below the middle, acute at the apex, subcordate at the base, upper surface roughened with long barbed spine-like hairs, lower surface densely covered with verticillate glochidiate hairs, scabrous; flowers in forks of branches, orange, closed during the day; calyx-tube cylindrical or subconical, at-

tenuated below into a short pedicel, densely clothed with long antrorse spine-like and verticillate glochidiate hairs; calyx-lobes ovate, lanceolate, long-acuminate, 10 mm. long, persistent on the fruit, dark, irregularly reflexed; petals 5, yellow, obovate, 1–2 cm. long, narrowed at base, apex short-acuminate; stamens about 60, in 3 series, the 10 exterior linear and 1 cm. long, the rest filiform and shorter; capsule subcylindrical, attenuated at base with pedicel 8 mm. long, grayish, scabrous; seeds 4–5, in 1 or 2 series, pendulous.

Distribution: open rocky slopes, on shale and gravel, in Peru and Bolivia.

Specimens examined:

PERU: without definite locality or date of collection, *McLean* (K); dry plains, Anco, (probably *Matthews*) 596 (K); loose soils of steep southern slope, Matucana, 8000 ft. alt., 12 April–3 May 1922, *Macbride & Featherstone* 130 (US); stony slopes, shale, and gravel, Huanuco, about 7000 ft. alt., 5–8 April 1923, *Macbride* 3215 (US); open rocky slopes, along Rio Chillon, near Viscas, Dept. Lima, 1800–2000 m. alt., 10–15 June 1925, *Pennell* 14472 (ANSP, US); open rocky slopes, San Buenaventura, Dept. Lima, 2700–2800 m. alt., 17 June 1925, *Pennell* 14568 (ANSP).

7. *M. strigosa* HBK. Nov. Gen. & Sp. 6: 120. 1823; DC. Prodr. 3: 343. 1828; Urban & Gilg in Nov. Act. Nat. Cur. [Abh. K. Leop.-Carol. Deutsch. Akad. Naturf.] 76: 55. 1900.

Perennial; stems erect, brown or brownish-gray, terete, striated, scabrous; leaves alternate, sessile, ovate-triangular, 3 cm. long, shortly acuminate, serrate, deeply incised and partially 3-lobed, rotund to subcordate at the base, scabrous, subcanescent on both surfaces; flowers disposed in cymose clusters at the apex of branches; calyx-tube obconical to turbinate, attenuate, 5–6 mm. long, hirsute; calyx-lobes lanceolate to linear-lanceolate, 10–12 mm. long, long-acuminate, pilose, persistent, reflexed in fruit; petals 5, yellow, obovate or obovate-oblong, narrowed toward the base, long-apiculate or acuminate, 2–2.5 cm. long, apex pilose; stamens about 50, in 2 or 3 series, the exterior 10 filaments about 1.6 cm. long, broadened, others filiform and shorter; style filiform, glabrous, angled, persistent in fruit; capsule obconical, attenuated, 1–1.5 cm. long, sessile, brownish-black; seeds 8–10, pendulous, irregu-

larly ovate to ovate-oblong, brownish-yellow, striate, more or less tuberculate-verrucose, not winged.

Distribution: reported from Mexico. Though no authentic material has been available for critical study, *M. strigosa* is apparently a distinct Mexican species and has been retained as such by the writer. It is closely related to *M. soratensis* of South America and to *M. hispida* of Mexico.

8. *M. cordobensis* Urban & Gilg in Rev. Mus. de La Plata 5: 289. 1893; in Nov. Act. Nat. Cur. [Abh. K. Leop.-Carol. Deutsch. Akad. Naturf.] 76: 63. 1900.

M. chilensis Griseb. Abh. Ges. Göttingen [Pl. Lorentz.] 19: 102. 1874.

Perennial; stems erect, 8–10 dm. high, brownish or yellowish-brown, scabrous; leaves alternate, lanceolate to ovate-lanceolate, 7 cm. long, dentate or serrate, scabrous, subcanescent, apex shortly acuminate, base round; lower leaves petiolate, the petioles 4–5 mm. long, upper subsessile; flowers in cymes at apex of branches; calyx-tube obconic to turbinate, attenuated below, 6 mm. long, scabrous; calyx-lobes lanceolate-acuminate, pilose, black, persistent, withered, reflexed in fruit; petals 5, orange, obovate to obovate-ovate, narrowed toward the base, long-acuminate, 1.8–2 cm. long, pilose; stamens 50, in 3 series, the 10 exterior filaments 1.5 cm. long, linear, the inner series filiform and shorter; style filiform, persistent on the fruit; capsule obconical or turbinate; black, scabrous, 1.3–1.5 cm. long, attenuated into a short pedicel; seeds 4–6, pendulous, irregularly ovate to ovate-oblong, brown or brownish-black, irregularly striated, tuberculate-verrucose.

Distribution: in the Province of Cordoba, Argentina.

Specimens examined:

ARGENTINA: Province of Cordoba, without date, *Lossen 163* (ANSP, F, M); Cordoba, Dec. 1891, *Kuntze* (F).

9. *M. ignea* (Phil.) Urban & Gilg in Engl. & Prantl, Nat. Pflanzenfam. 3^{6a}: 110. 1894; in Nov. Act. Nat. Cur. [Abh. K. Leop.-Carol. Deutsch. Akad. Naturf.] 76: 58. 1900.

Loasa ignea Phil. Anal. Mus. Nat. Chile, Bot. 1891: 24. 1891.

Perennial; stems erect, branched above, yellow or yellowish-

white, terete, striate, scabrous; leaves alternate, sessile, broadly ovate, 3.5–3.8 cm. long, scabrous, subcanescent, dentate or serrate, incised, base cordate-semiamplexicaul; flowers sessile at the apex of branches; calyx-tube subturbinate or subcylindrical, 5 mm. long, attenuated into a short pedicel, hirsute; calyx-lobes ovate, acuminate, pilose, persistent, withered, yellow, reflexed in fruit; petals 5, orange, obovate, long-apiculate, 1.5–2 cm. long, apex pilose; stamens 40–50, in 2 or 3 series, the 10 exterior filaments longer and more broadened than the inner filiform series; style filiform, persistent, withered in fruit; capsule subturbinate to subcylindrical, black, 1–1.3 cm. long, attenuated into a pedicel; seeds 5–6, pendulous, irregularly ovate to ovate-oblong, brownish-gray or grayish-yellow, irregularly striate to tuberculate-verrucose, not winged.

Distribution: in Chile and Peru.

Specimens examined:

PERU: Arequipa Desert, 21 Aug. 1925, *Cockerell* (US).

10. *M. chilensis* Gay, Fl. Chile 2: 431. 1846.

Perennial with stems more or less erect, brown or brownish-yellow, striate, scabrous; leaves alternate, sessile, broadly ovate, 2–3.5 cm. long, dentate or crenate, obtuse at the apex, rotund at the base, rarely subamplexicaul-cordate, scabrous on both surfaces, canescent; flowers sessile, in clusters of 1–3 at ends of branches; calyx-tube obconical or turbinate, 12–18 mm. long, attenuated into a pedicel, scabrous; calyx-lobes lanceolate, 10–12 mm. long, long-acuminate, pilose, persistent, withered, blackish, and reflexed on the fruit; petals 5, orange-yellow, obovate, shortly apiculate, 1–1.5 cm. long, apex pilose; stamens 40–50, in 2 or 3 series, filaments linear or filiform, 1 cm. long; style filiform, 1 cm. long, glabrous, angled, persistent on the fruit; capsule obconical or turbinate, base attenuated, pedicellate, black, scabrous, 9 mm. long; seeds 6–8, pendulous, irregularly obovate to ovate-oblong, brown or brownish black, irregularly striate to tuberculate-verrucose, not winged.

Distribution: in Chile and Argentina.

Specimens examined:

ARGENTINA: Puntilla de Villavil, Prov. Catamarca, Feb. 1876, *Schickendantz* 250 (M photograph).

10a. *M. chilensis* Gay var. ***atacamensis*** Urban & Gilg in Nov. Act. Nat. Cur. [Abh. K. Leop.-Carol. Deutsch. Akad. Naturf.] **76**: 50. 1900.

M. chilensis Phil. Fl. Atac. 19, No. 109. 1860.

Calyx-lobes linear-lanceolate, about 7 mm. long, acuminate; calyx-tube subcylindrical-oblong, attenuated into a pedicel 2–3 mm. long.

Distribution: Atacama Desert, Chile.

Specimens examined:

CHILE: Atacama Desert, without date, *Philippi* (M photograph, V); Prov. Antofagasta, Taltal, 50 m. alt., Oct. 1925, *Werdemann* 798 (F, M, US).

11. *M. sessilifolia* Urban & Gilg in Nov. Act. Nat. Cur. [Abh. K. Leop.-Carol. Deutsch. Akad. Naturf.] **76**: 57. 1900.

Perennial; stems erect, yellow, striate, scabrous; leaves alternate, sessile, broadly ovate to ovate-orbicular, 3.5 cm. long, denticulate or crenate, acute or obtuse at the apex, subcordate at the base, scabrous, and subcanescent; flowers disposed in cymes at ends of branches; calyx-tube obconical to turbinate, attenuated, 7–8 mm. long, scabrous; calyx-lobes lanceolate, long-acuminate, pilose, persistent, withered, reflexed and black; petals 5, yellow, obovate to obovate-lanceolate, narrowed at the base, apiculate and pilose at the apex, 22–25 mm. long; stamens about 40, in 2 or 3 series, the 10 exterior filaments 1.6 cm. long and somewhat broadened, inner series shorter and filiform; style 1.7 cm. long, persistent and withered on the fruit; capsule obconical to narrowly turbinate, attenuated, sessile, 1.4–1.5 cm. long, black, scabrous; seeds 5–7, pendulous, irregularly ovate to ovate-oblong, gray or grayish-yellow, irregularly striate, densely tuberculate-verrucose, not winged.

Distribution: Mexico.

Specimens examined:

MEXICO: Minas de San Rafael, San Luis Potosi, Nov. 1910, *Purpus* 4930 (C); Dist. Etla, Oaxaca, 25 Sept. 1920, *Conzatti* 4051 (US).

12. *M. parvifolia* Urban & Gilg in Rev. Mus. de la Plata **5**: 289. 1893; in Nov. Act. Nat. Cur. [Abh. K. Leop.-Carol. Deutsch. Akad. Naturf.] **76**: 45. 1900.

M. chilensis Griseb. Symb. Argent. 138. 1879. (not *M. chilensis* Gay).

M. Grisebachii Urban & Gilg in Nov. Act. Nat. Cur. [Abh. K. Leop.-Carol. Deutsch. Akad. Naturf.] **76**: 48. 1900.

Biennial or perennial herbaceous plants; stems few to several, branching freely, sprawling or spreading, white or yellowish, covered with short verticillate glochidiate hairs; leaves alternate, sessile or nearly so, ovate, 2–4 cm. long, often smaller, dentate to sinuate-dentate, frequently deeply lobed, acute at the apex, cuneate at the base and narrowed into a very short petiole, scabrous to subcanescent, lower surface covered with verticillate glochidiate hairs, upper surface clothed with antrorse spine-like hairs; flowers in forks of the branches, sessile; calyx-tube cylindrical, 5 mm. long, not attenuated below, densely covered with verticillate glochidiate hairs; calyxlobes ovate-lanceolate, acute or shortly acuminate, 3–4 mm. long, deciduous; petals yellow or orange, obovate-oblong to oblong, 5–7 mm. long, narrowed at base, densely pilose on the dorsal surface near the apex; filaments 10–12, in 1 series, 4–5 mm. long, filiform, linear; capsule cylindrical, sessile, not attenuated at base, obtuse, 7–12 mm. long, brown or brownish-black, always somewhat recurved, striated, crowned with persistent style; seeds 1–4, pendulous, oblique to irregularly rectangular, tuberculate, undulate-striate, brown to brownish-gray, not winged.

Distribution: Bolivia and Argentina.

Specimens examined:

BOLIVIA: Bolivian plateau, collection of 1891, *Bang* 1005 (ANSP, K, M, US).

ARGENTINA: LaPlaza, Dept. Andalaga, Prov. Catamarca, 2400 m. alt., 9–10 Feb. 1916, *Jørgensen* 1600 (C, M, US); Cordoba, Dec. 1891, *Kuntze* (F).

13. *M. oligosperma* Nutt. in Sims, Bot. Mag. **42**: *pl.* 1760. 1815; DC. Prodr. **3**: 343. 1828; G. Don, Hist. Dichl. Pl. **3**: 65. 1834; Torrey & Gray, Fl. N. Am. **1**: 533. 1840; Dietrich, Syn. Pl. **3**: 84. 1843; Gray in Mem. Am. Acad. [Pl. Fendl.] **4**: 47. 1849; Gray in Boston Jour. Nat. Hist. [Pl. Lindh. pt. 2] **6**: 191. 1850; Urban in Nov. Act. Nat. Cur. [Abh. K. Leop.-Carol. Deutsch. Akad. Naturf.] **76**: 47. 1900; Small, Fl. Southeast. U. S. 809. 1903; Gray, Man. Bot. ed. 7. 588. 1908; Coulter & Nelson, Man. Bot. Rocky Mts. 324. 1909; Rydb. Fl. Rocky Mts. & Adj. Plains, ed. 2. 574. 1922.

M. aurea Nutt. Gen. **1**: 300. 1818.

M. rhombifolia Nutt. ex Torrey & Gray, Fl. N. Am. **1**: 533. 1840.

M. petiolata Buckley in Proc. Acad. Sci. Phila. **13**: 455. 1861.

M. Nelsonii Greene in Erythea **3**: 70. 1895.

M. Diehlii Jones, Contr. West. Bot. **12**: 16. 1908.

M. monosperma Wootton & Standley in Contr. U. S. Nat. Herb. [Fl. N. Mex.] **16**: 149. 1913.

Perennial herbaceous plants, rough with multi-barbate hairs; stems erect, dichotomously branched, brittle, white or yellowish, cortex becoming loose and papery; leaves alternate, ovate to ovate-lanceolate, 3–7 cm. long, 2–3 cm. broad, sessile, rarely subsessile, irregularly toothed or incised, somewhat lobed and angled, apex acute, base narrowed to cuneate, both surfaces of leaf armed with barbed glochidiate and antrorse spine-like hairs; flowers toward the apex of branches, in 1–3-flowered cymes; calyx-tube narrowly cylindrical, not attenuated, sessile, 5–6 mm. long, terete, densely covered with verticillate glochidiate hairs; calyx-lobes lanceolate, linear, long-acuminate, 7–9 mm. long, covered with glochidiate hairs, deciduous in mature fruit; petals 5, cuneate-oblong, 8–10 mm. long, cuspidate, entire, somewhat shorter than the stamens, dorsal surface densely covered with short hairs at the apex, otherwise glabrous; stamens about 25, in 2 series, all nearly equal, 7–9 mm. long, filaments linear, filiform; capsule cylindrical, 1–1.5 cm. long, yellowish-green or yellow, scabrous, coriaceous or woody, nearly always curved, striate, sessile; seeds 1–4, pendulous, obovate to obliquely rectangular, irregularly tuberculate, undulate-striate, brown or mottled grayish-brown, not winged.

Distribution: on dry, exposed, gravelly or sandy places, from Texas to Arkansas and west to Wyoming and New Mexico. (One specimen collected by Dr. Leavenworth in "eastern Florida.")

Specimens examined:

FLORIDA: "eastern Florida," Dr. Leavenworth (ANSP, M).

MISSOURI: rocky glades, Jackson Co., 4 Aug. 1864, Broadhead (M); rocky bluffs, Sept. 1869, E. Hall (F); Allenton, 27 Aug. 1878, Letterman (US); St.

Louis Co., 25 June 1879, *Letterman* (F); rocky hills near St. Louis on Meramec River, 27 June 1879, *Eggert* (C, M, US); Allenton, 20 June 1880, *Letterman* (D, F, M); Allenton, June 1882, *Letterman* (F, US); Allenton, 18 July 1883, *Kellogg* (M); Dodson, 26 Aug. 1885, *Bush* 238 (M); St. Paul, St. Louis Co., 25 June 1886, *Wislizenus* 505 (M); rocky hills north of Glencoe, Sept. 1887, *Eggert* (M); Green Co., 22 June 1888, *Blankinship* (US); Glencoe, 25 Sept. 1890, *Glatfelter* (M); southwest Missouri, 1890, *E. Hall* (F); rocky hills near St. Louis, 21 May 1896, *Eggert* (M); limestone cliffs, near Glencoe, May 1897, *Russell* (M); Gasconade, below Big Piney River, 12 Aug. 1897, *Trelease* 348 (M); crevices of rock, Dodson, 10 July 1898, *Mackenzie* 233 (F, RM); barrens, Noel, 9 Aug. 1908, *E. J. Palmer* (M); barrens, Noel, 9 Aug. 1908, *Bush* 5034 (M); exposed limestone bluffs on Grove Creek, Jasper Co., 22 June 1909, *E. J. Palmer* 2356 (M); dry cliffs, Scotland, 27 June 1909, *E. J. Palmer* 2356 (M); barrens, Purcell, 11 Aug. 1907, *E. J. Palmer* 1099 (M); on mine dumps near Mo. Pac. depot, Carthage, 17 July 1910, *E. J. Palmer* 3004 (M); limestone ledges, vicinity of Gates, Greene Co., 26 Aug. 1912, *Standley* 9400 (US); Jerome, 10 July 1912, *Kellogg* (M); dry limestone ledges, Careyton, Jasper Co., 8 June 1913, *E. J. Palmer* 3986 (M); by railroad, near Glencoe, 13 July 1918, *Greenman* 3836 (M).

ARKANSAS: White River near Eureka, 18 July 1898, *Glatfelter* (M); dry rocky hillsides, Norfolk, Baxter Co., 20 June 1914, *E. J. Palmer* 6043 (M); exposed limestone ledges, Beaver, Carroll Co., 22 June 1914, *E. J. Palmer* 6327 (M).

SOUTH DAKOTA: Hot Springs, without date, *MacElwee* (ANSP); Elk Creek Canyon, Black Hills, 14 Aug. 1908, *Visher* (F); Rapid City, 6 Aug. 1908, *Visher* 1293 (F); dry clay bank, Erskine, Hot Springs, 22 July 1924, *McIntosh* 504 (RM); East Park Gate, Grace Coolidge Creek, Black Hills, 24 July 1929, *Lee* (RM).

KANSAS: Junction City, without date, *Moyer* (US); Lawrence, Sept., without date, *Stevens* (US); Pawnee Rock, western prairies, Sept. 1848, *Gordon* (M); Miami Co., Aug. 1883, *Oyster* (M); Manhattan, Riley Co., 7 July 1884, *Kellerman* (US); prairies and naked clay bluffs, Caldwell, 10 Sept. 1890, *Smyth* 272 (US); Manhattan, 30 Aug. 1892, *Norton* (M, US); Phillipsburg, 5 Aug. 1892, *Harshbarger* (F); Manhattan, Sept. 1893, *Norton* (M); gravelly places, near Osborne City, 2 June 1894, *Shear* 67 (US); stony hills, Riley Co., 29 June 1895, *Norton* 174 (M, RM, US); Riley Co., July 1897, *Pond* (P); Cowley Co., July 1898, *White* (M); limestone hillsides, 12 miles north of Scott City, 16 July 1929, *Rydberg & Imler* 1086 (M).

OKLAHOMA: without locality, 8 July 1872, *Hall* (US); Limestone Gap, 20 July 1877, *Butler* (F, M); without locality, June 1877, *Butler* 14 (M); Limestone Gap, 1877, *Butler* 57 (M); Caddo, 20 June 1891, *Sheldon* 231 (US); Cherokee Outlet, 8 June 1891, *Carleton* 216 (US); near Tucker, July 1893, *Brown* (ANSP); Woods Co., 29 June 1900, *White* (RM); Mountain Park, 17 July 1903, *Duncan* 57 (M); dry calcareous banks, Marietta, Love Co., 10 July 1916, *E. J. Palmer* 10417 (D, M); Davis, 19 June 1916, *Emig* 610 (M); vicinity of Fort Sill, 22 June 1916, *Mrs. J. Clemens* 11694 (M); Fort Sill, 1 June 1916, *Mrs. J. Clemens* 11694 (RM); Arbuckle Mts., near Davis, 23 June 1917, *Emig* 828 (M); sandy rocky soil on river bank, 1 mile northwest of Ripley, Payne Co., 25 July 1927, *Stratton* 232 (M); rocky clay soil, 3 miles south of Hitchcock, Blaine Co., 26 Aug. 1927, *Stratton* 476 (M).

TEXAS: without definite locality, *Drummond* 49 (V); Bexar Co., without date, *Jermy* (M); Gill Co., without date, *Jermy* (US); Enchanted Rock, Gillespie Co.,

without date, *Jermy* 164 (M, US); Shackelford Co., without date, *Holstein* (ANSP); without definite locality, collection of 1835, *Drummond* 90 (300) (V); 15 July 1845, *Fremont's Expedition* 123 (M); Guadalupe, July-Aug. 1846, *Lindheimer* 396 (ANSP, C, M, US, V); Cibola, near Guadalupe, May 1846, *Lindheimer* 143 (M); Comanche Spring, near New Braunfels, June 1849, *Lindheimer* 816 (F, M, US); Mexican Boundary Survey, northwestern Texas, 1852, *Parry* (M); Fort Smith to the Rio Grande, 31 Aug. 1853, *Bigelow* (US); dry uplands, Dallas, June 1879, *Reverchon* 323 (M, US); Navarro Co., 22 May 1880, *Joor* (M); Linn Co., Aug. 1883, *Oyster* 2800 (CAS); without locality, 1887, *Nealley* (US); Colorado, 8 June 1890, *Eggert* (M); without locality, 1890, *Nealley* (US); without locality, 1892, *Nealley* 122 (US); Dallas, 15 June 1898, *Glatfelter* (M); Turtle Creek, Kerr Co., 2 May 1899, *Bray* 223 (US); stony hills, West Dallas, 23 June 1899, *Eggert* (M); common on hills, Dallas, 29 Sept. 1900, *Bush* 1178 (M); Canyon, 13 Aug. 1900, *Eggert* (M); San Antonio, common in barrens, 20 Sept. 1901, *Bush* 859 (M); Weatherford, 30 May 1902, *Tracy* 8047 (F, M, US, V); Bexar Co., 1903, *Jermy* (M); on limestone hills near Bracken, Bexar Co., 29 June 1903, *Groth* 21 (F, US); Coombs Branch, 25 July 1903, *Reverchon* 323 (M); Waco, 16 Sept. 1905, *Pace* 30 (M); Leon Springs, Bexar Co., 29 May 1911, *Clemens & Clemens* 542 (M, P); San Antonio, Bexar Co., 20 June 1911, *Clemens & Clemens* 541 (P, RM); dry ground, Chisos Mts., 14 Aug. 1915, *Young* (M); dry limestone bluffs, San Saba Co., 4 May 1917, *E. J. Palmer* 11800 (M); sandy uplands, open woods, Clyde, Callahan Co., 26 May 1918, *E. J. Palmer* 13697 (M); dry rocky banks of canyon, Gamble's Ranch, Armstrong Co., 6 June 1918, *E. J. Palmer* 13988 (M); dry exposed ledges, limestone bluffs, Strawn, Palo Pinto Co., 26 June 1918, *E. J. Palmer* 14249 (M); flats along ocean, North Beach, Corpus Christi, Nueces Co., 7 Aug. 1921, *Ferris & Duncan* 3229 (CAS, D, M); Dunham's Island, 6 Sept. 1922, *Tharp* 1580 (US); Pumpville, 1500 ft. alt., 19 July 1922, *Fisher* 295 (US); rocky ground along Limpia Creek, near Ft. Davis, Jeff Davis Co., 17 June 1926, *E. J. Palmer* 31003 (M); rocky hillsides, Goliad, April 1927, *Williams* 83 (ANSP); north of Del Rio, 17 April 1930, *Jones* 25661 (M).

COLORADO: Cañon City, 1872, *T. S. Brandegees* B377 (C, M); Cañon City, 1873, *T. S. Brandegees* (ANSP); Cañon City, June 1877, *T. S. Brandegees* (F); foothills, Larimer Co., 6000 ft. alt., 20 July 1895, *Cowen* (C, M, RM); near foothills, west of Loveland, 23 Aug. 1905, *Osterhout* 3154 (RM).

14. *M. Lindheimeri* Urban & Gilg in Nov. Act. Nat. Cur. [Abh. K. Leop.-Carol. Deutsch. Akad. Naturf.] **76**: 54-55. 1900.

Annual, 5-6 dm. high; stems solitary, dichotomously branched toward apex, erect, striated, yellow or yellowish-white, densely scabrous; leaves alternate, bright green, ovate, 6-7 cm. long, dentate or crenate to more or less deeply incised to 3-lobed—the middle lobe large, acute or shortly acuminate at the apex—upper surface and margins scabrous with spine-like hairs, lower surface clothed with glochidiate hairs; flowers at

apex of branches or borne in forks of dichotomous branches, yellow to orange; calyx-tube conical, attenuated below into the pedicel, often slightly reflexed, hirsute-scabrous, canescent; calyx-lobes, lanceolate or ovate-lanceolate, 5–10 mm. long, acuminate, scabrous, variously curved and reflexed, frequently persistent on the fruit, dark green; petals 5, obovate, 1–1.5 cm. long, shortly apiculate, pilose at the apex, otherwise glabrous; stamens 40–45, in 2 series, filaments narrowly linear, 7–9 mm. long; style 1 mm. long, filiform, angled, papillose at the apex, persistent in fruit; capsule obconical to subcylindrical, brownish-gray, scabrous, irregularly plicate, rugose; seeds about 10, pendulous, irregularly ovate to ovate-oblong, grayish-yellow, densely tuberculate-verrucose, not winged.

Distribution: dry, sandy or limestone habitats, Texas southward into Mexico.

Specimens examined:

TEXAS: Comal Co., without date, *Matthes 392* (V); indefinite locality, *Wright* (P); indefinite locality, Aug. 1845, *Lindheimer 396* (M, V); indefinite locality, May–Oct. 1849, *Wright 210* (US); western Texas, 1851, *Parry* (ANSP); Llano Co., 1861, *Buckley* (ANSP); western Texas, 1883, *Havard* (US); Uvalde Co., June 1885, *Reverchon 1650* (M, US); Limpia Cañon, 1889, *Nealley 660* (US); Corpus Christi, Nueces Co., 28–31 May 1894, *Heller 1791* (ANSP, C, P, US); shady rocks, Devil's River, Valverde Co., 11 Sept. 1900, *Eggert* (M); Corpus Christi, May 1913, *Orcutt 5940* (M); vicinity of Corpus Christi, Oct. 1913, *Rose 18081* (US); shaded limestone cliffs, Concan, Uvalde Co., 14 June 1916, *E. J. Palmer 10205* (M); Pleasanton, Atascosa Co., 23 Sept. 1916, *E. J. Palmer 10786* (M); Nabbs Ranch, Palm Grove, Nov. 1923, *Runyon 583* (US).

MEXICO: Cerro de Berrego, Oaxaca, without date, *Mohr 144* (US); Walnut Grove, Monterey, 26 May 1847, *Gregg 782* (M); Cochuto, Sonora, 5100 ft. alt., 4 Oct. 1890, *Hartman 93* (US); Oaxaca Valley, State of Oaxaca, 5000 ft. alt., 23 Oct. 1894, *Smith 827* (M, US); San Luis Potosi and vicinity, July–Aug. 1898, *Palmer 648* (US); Tehuantepec, July 1900, *Gonzalez* (V); Oaxaca, 1750 m. alt., July–Aug. 1900, *Conzatti & Gonzalez 19* (M, US); near Tehuacan, Puebla, 30 Aug.–8 Sept. 1905, *Rose, Painter & Rose 10017* (M); Santa Ana, Oaxaca, 1700 m. alt., 19–23 June 1906, *Conzatti 1458* (US); vicinity of Victoria, Tamaulipas, 320 m. alt., May–June 1907, *Palmer 404* (F, M, US); Cerro San Antonio, Oaxaca, 18 Aug. 1907, *Conzatti 1985* (F); Tlaxcala, 2200 m. alt., 20 July 1910, *Arsène & Nicolas 5291* (K, M, US); Telmacan, 7 Sept. 1919, *Reko 4228* (US); Cerro de los Armadillos, vicinity of San Jose, 9 July 1930, *Bartlett 10188* (MH).

15. *M. adhaerens* Benth. Bot. Voy. Sulph. 15. 1844; Walp. Rep. 5: 776. 1845-46; Urban & Gilg in Nov. Act. Nat. Cur.

[Abh. K. Leop.-Carol. Deutsch. Akad. Naturf.] **76**: 51. 1900; Johnston in Proc. Cal. Acad. Sci. IV. **12**: 1103. 1924.

Annual or biennial plants, from a slight tap-root, extremely scabrous or hispid throughout, .7–7 dm. high; stems mostly slender, flexuous, trichotomously branched near the base, dichotomously branched above, white or ochroleucous, epidermis scarious, scaling on mature plants, scabrous with glochidiate hairs below, more densely hispid with glochidiate and spine-like hairs above; leaves alternate, thin, round-ovate, 2–8 cm. long, 1–5 cm. broad, coarsely dentate to sinuate-lobate, more or less incised, irregularly 3–5-lobed, acute at the apex, cuneate at base, hispid with short glochidiate hairs on under surface, especially along the veins, upper surface armed with a few spine-like or anchor-like hairs; lower leaves petiolate, petioles 1–6 mm. long, upper leaves sessile; flowers borne singly in axils of dichotomous branches, subtended by small leafy scabrous roundish bracts, sessile or very short-pedicelled; calyx-lobes 5, dark green, acute or acuminate at apex, nearly equaling the petals in length, dorsal surface covered with long spine-like hairs interspersed with short stiff glochidiate hairs; calyx-tube obconical to turbinate, attenuated at base, pedicelled, hispid with long slender spine-like and glochidiate hairs, 5–7 cm. long; calyx-lobes reflexed or straight, persistent, rugose, tuberculate, covered with long spine-like and anchor-like hairs; petals 5, pale to golden-yellow, obovate to oblong-obovate, spreading, 1–1.5 cm. long, .5–1.0 cm. broad, gradually narrowed toward the base, apex short-apiculate and somewhat pilose; stamens 30–40, in 2 series, filaments narrowly linear to filiform, 7–8 mm. long, anthers oblong; style filiform, 3-parted, stigmatic lobes densely papillose, persistent and withered in fruit; mature capsule obconical to turbinate, brownish-yellow, pedicellate; seeds 10–13, in 1 or 2 series, pendulous, ovate to round-ovate, mottled yellow, irregularly striate and tuberculate-verrucose, not winged.

Distribution: in sheltered places, common on rocky or gravelly situations, in Lower California and on islands in the Gulf of California.

Specimens examined:

LOWER CALIFORNIA: Cedros Island, 1876, *Street* (US); Los Angeles Bay, Island of San Pedro Martir, 1887, *Ed. Palmer 402* (US); Carmen Island, 1-7 Nov. 1890, *Ed. Palmer 831* (US); La Paz, 20 Jan.-5 Feb. 1890, *Ed. Palmer 57* (US); Santa Agueda, 4-6 March 1890, *Ed. Palmer 254* (US); Cedros Island, March-June 1897, *Anthony 300* (M, D, US); Calmabia, washes, 1400 ft. alt., Jan.-March 1898, *Purpus 62* (RM); Espiritu Santo Island, 50-100 ft. alt., 7 Feb. 1906, *Nelson & Goldman 7508* (US); frequent over higher parts of San Pedro Martir Island, 18 April 1921, *Johnston 3156* (CAS, US); sandy draw, San Luis Gonzales Bay, 29 April 1921, *Johnston 3337* (CAS, US); uncommon on lava slopes, Tortuga Island, 11 May 1921, *Johnston 3604* (CAS); rocky ground at foot of bluff, Coyote Bay, 18 June 1921, *Johnston 4171* (CAS); sandy wash, 3 miles north of Willard's Point, 3 July 1921, *Johnston 4257* (CAS); La Paz, Feb. 9 and 25, 1928, *Jones 24307* (CAS, M, P); Todos Santos, on the north, 17 Feb. 1928, *Jones 24308* (CAS, M, P).

16. *M. floridana* Nutt. ex Torrey & Gray, *Fl. N. Am.* 1: 533. 1840; Walp. *Rep.* 2: 223. 1843; Dietrich, *Syn. Pl.* 3: 85. 1843; Chapman, *Fl. Southeast. U. S.* ed. 3, 167. 1897; Small, *Fl. Southeast. U. S.* 809. 1903, and ed. 2, 810. 1913; Urban & Gilg in *Nov. Act. Nat. Cur.* [Abh. K. Leop.-Carol. Deutsch. Akad. Naturf.] 76: 53. 1900; Small in *Addisonia* 4: 13, *pl.* 127. 1919.

Annual or perennial herbaceous plants, 2-10 dm. high; stems repeatedly dichotomously branched, reclining or occasionally erect, flexuous, slender, densely clothed with minute glochidiate-hispid hairs; leaves alternate, irregularly and rather distantly disposed on the stem, dull green, rotund-ovate to triangular-ovate, hastate, 2-7 cm. long, 1.5-5 cm. broad, coarsely toothed or lobed, acute or shortly acuminate at the apex, rotund or cuneate to subcordate at the base, narrowing abruptly into a dark green petiole 0.5-2 cm. long, impressed-veined and scabrous with spine-like hairs above, prominently veined and with more numerous glochidiate hairs beneath, especially along the veins; flowers near the apex, axillary, sessile; calyx-tube obconical, attenuate but not pedicellate below, about 8-15 cm. long, 3-5 cm. broad, densely covered with long unequal glochidiate hairs, intermixed rarely with spine-like hairs; calyx-lobes 5, imbricated, ovate-oblong, acuminate, lanceolate, 6-8 mm. long, 2.5-3 mm. broad at base, short-acuminate to acute at the apex, persistent, erect, becoming almost black at maturity; petals 5, imbricated, obovate, broadly cuneate to orbicu-

lar-cuneate, 1–1.5 cm. long, 0.8–0.9 cm. broad, concave, usually abruptly short-apiculate at the apex, gradually narrowed below, pilose near the apex, otherwise glabrous; stamens 30–35, in 2 series, filaments narrowly linear, 7–8 mm. long, anthers all equal, oblong or oval-oblong, laterally dehiscent; style 6 mm. long, filiform, glabrous, narrowed, 3 stigmatic surfaces with papillose margins near the apex, persistent in the fruit; capsule obconical, papery, attenuated into a pedicel 3–4 mm. long when young, at maturity 1.5–1.8 cm. in length; seeds 8–10, in 1 or 2 series, pendulous, irregularly ovate to ovate-oblong, yellowish mottled with brown, irregularly striate to densely tuberculate-verrucose, 2.5 mm. long, 1.8 mm. broad, not winged.

Distribution: in hammocks and clearings, Florida and the Bahama Islands.

Specimens examined:

FLORIDA: southern Florida, various collections without date, *Chapman* (ANSP, F, M, US); without definite locality or date, *Calkins* (US), and *Peale* (ANSP TYPE); Miami, without date, *Garber* (ANSP); Lake City, without date or collector's name, *Hitchcock Herb. 1366* (F); Manate, southwestern Florida, July 1845, *Rugel 252* (V); Indian River, 1874, *Palmer 181* (F, M, US); Cedar Keys, April 1876, *Garber* (F, US); Miami, April 1877, *Garber* (ANSP, F, US); shell islands at the mouth of St. John's River, Oct. 1878, *Curtiss 659* (ANSP, US), and *Curtiss 959* (CAS, F, M, US); on shell mounds, Manatee Co., 20 March 1887, *Rothrock* (ANSP, F, M); without definite locality, collection of 1889, *Simpson* (US); Lake Worth, 1 Feb. 1892, *Meehan* (ANSP); Palm Beach, 29 March 1895, *Canby* (US); hammocks, Palm Beach, 27 Dec. 1895, *Webber 255* (F, M); Palm Beach, 26 Dec. 1895–11 Jan. 1896, *Hitchcock 674, 675, 676, 677* (F); rich calcareous land, Miami, 28 March 1897, *Curtiss 5842* (F, M, US); Fort George, Duval Co., Oct. 1897, *Light-hipe 8431* (RM); Rockledge, 12–14 April 1897, *Crawford* (ANSP); Sneed's Island, 28 April 1900, *Tracy 6818* (F, M, US, V); Marco, July–Aug. 1900, *Hitchcock* (F); Fisherman's Key, 15 May 1901, *Tracy 7469* (F, M, US); sea-shore thicket, Brevard Co., 27 Oct. 1902, *Fredholm 5500* (RM, US); in hammocks, Miami, Nov. 1903, *Small & Carter 676* (ANSP, F); Miami, 18 March 1904, *Britton 9* (F); in hammocks, near Palm Beach, 19 Nov. 1904, *Small* (ANSP); east coast, 10 April 1904, *Burgess 778* (F); vicinity of Palm Beach, 15 Feb.–15 March 1908, *Garvens* (F); Knight's Key, 28–29 Jan. 1909, *Small & Carter 286* (ANSP); Captiva, Lee Co., 15 March 1915, *Orrok* (US); vicinity of Marco, Lee Co., 25 Feb. 1916, *Standley 12787* (US); dry thicket, Rockledge, Brevard Co., 8–18 March 1916, *Bartram* (ANSP); waste ground, Miami, 8 March 1917, *Meredith* (ANSP); coastal sand dunes, Lauderdale Beach, Brevard Co., 17 Dec. 1929, *Moldenke 256* (M).

BAHAMA ISLANDS: in sandy soil, Governor's Harbor, Eleuthera, 19–20 Feb. 1907, *Britton & Millspaugh 5516* (F).

17. **M. texana** Urban & Gilg, Nov. Act. Nat. Cur. [Abh. K. Leop.-Carol. Deutsch. Akad. Naturf.] 76: 52-53. 1900.

Annual or biennial, 5-6 dm. high; stems solitary, erect, striate, yellow or brownish-yellow, scabrous, canescent; leaves alternate, ovate or ovate-triangular, 2-4 cm. long, remotely dentate, deeply incised to somewhat trilobed, acute at the apex, rotund at the base, shortly petiolate, upper and lower surface hirsute-scabrous, subcanescent; flowers at apex of branches, sessile; calyx-tube conical, attenuated, densely hirsute-scabrous; calyx-lobes lanceolate, acute or shortly acuminate at the apex, usually persistent on the fruit, almost black; petals 5, yellow, obovate, 7-9 mm. long, shortly apiculate, narrowed toward the base, apex pilose; stamens 20-25, in 1 series, all filiform or nearly linear; style persistent and withered on the fruit; capsule conical or subcylindrical, attenuated into a short pedicel or subsessile, 1.4 cm. long, brown, scabrous; seeds 7-8, pendulous, irregularly ovate to ovate-oblong, grayish-brown, striate, densely tuberculate-verrucose.

Distribution: southern Texas and Mexico.

Specimens examined:

TEXAS: indefinite locality, 1855, *Drummond 202* (V).

MEXICO: vicinity of Puebla, 2190 m. alt., 4 Oct. 1906, *Arsène 470* (M, US); Cerro Guadalupe, vicinity of Puebla, 2250 m. alt., 7 Nov. 1908, *Arsène 1863* (M, US); Rancho Posadas, Puebla, 1909, *Nicolas* (K).

18. **M. asperula** Wooton & Standley in Contr. U. S. Nat. Herb. 16: 148-149. 1913.

Annual herbaceous plants with erect branching stems, 3-5 dm. high, scabrous at first, later becoming more or less smooth below; upper branches strongly ascending, lower branches divergent and then erect; leaves narrowly ovate to lanceolate, 3-5 cm. long, coarsely and irregularly serrate-dentate, frequently laciniately 2-4-lobed near the base, hispid on the upper surface with verticillate spine-like and glochidiate hairs, the under surface densely covered with minute and longer glochidiate hairs, especially along the prominent veins, attenuated into petioles 8-10 mm. long; flowers terminal, axillary, sessile, white or yellow; calyx-tube terete, short-clavate,

elongating in fruit, densely hispid with barbed glochidiate hairs; calyx-lobes 5, narrowly lanceolate, 3–5 mm. long, acuminate at first, becoming subulate, more or less persistent until the fruit is mature; petals 5, ovate to obovate, 6–8 mm. long, short-apiculate, orange, early deciduous; filaments shorter than the petals, filiform, none dilated, 10–15 in number, anthers light yellow; fruit cylindric to long-clavate, 18–25 mm. long; seeds usually 8, pyriform to suborbicular or subrectangular, obscurely and bluntly angled, mottled grayish-brown, with parallel curved striae.

Distribution: shaded ravines, dry slopes, limestone hills in the mountainous regions of western Texas, New Mexico, Arizona and northern Mexico.

Specimens examined:

TEXAS: Limpia Canyon, 1889, *Nealley 659* (US); Valley of the Rio Grande, below Donna, *Parry, Bigelow, Wright, Shott 387* (US).

NEW MEXICO: Trujillo Creek, Sierra Co., 14 Sept. 1904, *Metcalf 1364* (CAS, F, M, P, US TYPE); Van Patten's Ranch, Organ Mts., Dona Ana Co., 10 Sept. 1899, *Wootton* (US); Mogollon Mts., Catron Co., Sept. 1880, *Greene* (P); shady ravines, Burro Mts., 12 Oct. 1881, *Rusby 139* (ANSP, F, M); without definite locality, 1851, *Wright 1081* (ANSP, US).

ARIZONA: Davidson's Canyon, 10 Sept. 1884, *Pringle* (F, US); Paradise, Slope 1, 5500 ft. alt., 19 Sept. 1907, *Blumer 1669* (F, M, US, V); Bowie, 20 Sept. 1884, *Jones 4308* (CAS, F, P, RM, US); Santa Rita Valley, 6000 ft. alt., Aug. 1874, *Rothrock 642* (F, US); Santa Rita Mts., 4500 ft. alt., 24 Aug. 1903, *Jones* (P); Santa Rita Mts., 26 Sept. 1880, *Engelmann* (M); Nogales, 28 Aug. 1927, *Peebles, Harrison & Kearney 4668* (US); Huachuca Mts., 5500 ft. alt., 3 Sept. 1903, *Jones* (P); near Fort Huachuca, Sept. 1894, *Wilcox 431* (US); Baboquivari Canyon, 11 Oct. 1925, *Peebles, Harrison & Kearney 397* (US); Baboquivari Mts., 25 Sept. 1927, *Harrison 4765* (US); Baboquivari Mts., 19 Sept. 1929, *Jones 24963* (M).

MEXICO: Soledad, Nuevo Leon, Feb.–Oct. 1880, *Palmer 351* (US); rocky hills near Chihuahua, 12 Sept. 1885, *Pringle 633* (ANSP, F, US); rocky hills near Chihuahua, 12 Nov. 1885, *Pringle* (V); hills near Chihuahua, 8 Oct. 1886, *Pringle 1077* (M); Durango and vicinity, April–Nov. 1896, *Palmer 484* (F, M, US).

19. *M. aspera* Linn. Sp. Pl. ed. 1. 516. 1753; Amoen. Acad. 5: 398. 1760; Willd. Sp. Pl. 2²: 1175. 1799; Juss. in Ann. Mus. Nat. Hist. 5: 18. 1804; Ait. f. Hort. Kew. 3: 302. 1811; Lunan, Hort. Jam. 1: 504. 1814; Spreng. Syst. 2: 601. 1825; DC. Prodr. 3: 343. 1828; Dietrich, Syn. Pl. 3: 85. 1843; Anderss. Galap. Veg. 222. 1854; Griseb. Fl. Brit. West Indies, 298. 1861; Gray in Proc. Am. Acad. 5: 158, 180. 1862; Brewer & Watson, Bot. Calif. 1: 235. 1876; Urb. Symb. Antill. 8: 457.

1920–21; Fawcett & Rendle, Fl. Jam. 5: 248. 1926; Small in Addisonia 15: 47, pl. 504. 1930.

M. stipitata Presl, Reliq. Haenk. 2: 40. 1835; Walp. Rep. 2: 224. 1843.

M. pedicellata Presl, Epim. Bot. 246. 1849.

M. albicaulis Torrey, Bot. Mex. Bound. Surv. 67. 1859, p.p. (ex Wats.).

Acrolasia squalida Hook. f. in Trans. Linn. Soc. Lond. 20: 222. 1851.

Annual herbaceous plants, generally straggling, sometimes erect; stems brownish-green, yellow, or nearly white, terete and longitudinally striate, covered with short verticillate glochidiate hairs intermixed with antrorse spine-like hairs, sparingly toward the base, more dense on the younger parts of plant; leaves alternate, lanceolate or ovate-lanceolate, widely ovate or triangular-ovate, 10–15 cm. long, 8 cm. broad, acute or short-acuminate at the apex, serrate or serrate-dentate or deeply incised in the middle part to almost three-lobed, base cuneate or abruptly narrowed into a petiole 2–5 mm. long, or subcordate to cordate, upper surface of leaves dark green, covered sparingly with long slender antrorse spine-like hairs, lower surface lighter green and densely covered with minute verticillate glochidiate hairs intermixed with longer ones; flowers sessile, axillary; calyx-tube terete, cylindrical, attenuated at the base, 6–11 mm. long, 2–3.5 mm. wide, covered with stiff verticillate glochidiate hairs; calyx-lobes 5, imbricated, lanceolate to linear-lanceolate, long-acuminate, 3–4 mm. long, 1–1.5 mm. wide, covered with long antrorse spine-like hairs, not persistent in the mature fruit; petals 5, obovate or oblong-obovate to obovate-orbicular, narrowed toward base, acute, 4–8 mm. long, 2.5–4 mm. wide, glabrous or hispid on the dorsal surface toward the apex; filaments 20–30, 1–2 series, exterior series always dilated and petaloid, spathulate, all fertile; anthers oblong or oval-oblong, laterally dehiscent; style filiform, 3-parted at apex, contorted, stigmatic surfaces papillose, sometimes persistent in fruit; capsule cylindrical or subcylindrical, 15–25 mm. long, 3–5 mm. wide, terete, inconspicuously striate, sessile, obtuse at the base, brownish-green, turning

brown, scabrous, papery, 3-valved, with alternate placentae; seeds 6-9, pendulous, irregularly ovate-oblong or oblong to subrectangular, 2.5-3.5 mm. long, 1.5 mm. broad, mottled grayish-yellow, irregularly tuberculate, minutely but strongly undulate-striate, not winged.

Distribution: southern Arizona, southward to Brazil, Bolivia, the Galapagos Islands and the West Indies.

Specimens examined:

ARIZONA: Nogales, 28 Aug. 1927, *Peebles & Harrison 4730* (US).

MEXICO: CHIHUAHUA—southwestern Chihuahua, Aug.-Nov. 1885, *Ed. Palmer 101* (ANSP, US); Guayanopa Canyon, Sierra Madre Mts., 3600 ft. alt., 24 Sept. 1903, *Jones* (P); near Chuichupa in the Sierra Madres, 4 Sept. 1899, *Townsend & Barber 407* (F, M, US); Sierra Madre, 6 Sept. 1899, *Barber & Townsend* (US); DURANGO—City of Durango and vicinity, April-Nov. 1896, *Ed. Palmer 484* (F); ZACATECAS—near San Juan Capistrano, 21 Aug. 1897, *Rose 2457* (US); SONORA—Hermosillo, 29 Oct. 1926, *Jones 22339* (P); LOWER CALIFORNIA—Cape St. Lucas, Aug. 1859-Jan. 1860, *Xantus 3b* (US); San Jose del Cabo, 23 Sept. 1890, *T. S. Brandegees 224* (ANSP, US); El Taste, 12 Sept. 1893, *T. S. Brandegees* (P); SINALOA—State of Sinaloa, 1922, *Ortega 4773* (US); Hacienda Labradas, vicinity of Labradas, 25 Sept. 1925, *Ferris & Mexia 5282* (CAS); NAYARIT—Maria Madre, Tres Marias Islands, 23 Oct. 1925, *Ferris 5660* (D, US); JALISCO—near Etzatlan, 2 Oct. 1903, *Rose & Painter 7549* (US); Bolanos, 10-19 Sept. 1897, *Rose 2896* (US); COLIMA—Colima, 20 Oct. 1910, *Orcutt 4531* (D, F, M); Colima, 24 Oct. 1910, *Orcutt 4534* (K); MICHOACAN AND GUERRERO—La Morena, 400 m. alt., 7 Dec. 1898, *Langlasse 704* (K, US); VERA CRUZ—Wartenburg, near Tantoyuca, Prov. Huasteca, 1858, *Ervendberg 206* (ANSP); OAXACA—vicinity of Cuicatlan, 1890-2500 ft. alt., 8-24 Oct. 1894, *Nelson 1661* (US); YUCATAN—Merida, 25 Nov. 1864, *Schott 41* (US); Merida, 10 Oct. 1865, *Schott 861* (M, US); Izamal, without date, *Gaumer 821* (CAS, D, F).

CENTRAL AMERICA: GUATEMALA—St. Thomas, 1841, *Friedrichsthal 378* (V); vicinity of Zacapa, Dept. Zacapa, 200-400 m. alt., Dec. 1906, *Pittier 1761* (US); PANAMA—low swampy ground, between Corozal and Ancon, Canal Zone, 10-30 m. alt., 3 Jan. 1911, *Pittier 2209* (US); around Gamboa, Canal Zone, 20-100 m. alt., Nov. 1911, *Pittier 4793* (US); Balboa Heights, 12 Jan. 1922, *Greenman & Greenman 5055* (M); Ancon Hill, Panama Canal Zone, 13 Jan. 1922, *Greenman & Greenman 5114* (M); brushy slopes, Sosa Hill, Balboa, Canal Zone, 27 Nov.-10 Dec. 1923, *Standley 25256* (US); coastal thicket, Bella Vista, 28 Nov. 1923, *Standley 25350* (US); open grassy slope, Ancon Hill, Canal Zone, 26 Nov.-9 Dec. 1923, *Standley 26360* (US); brushy slope, Gamboa, Canal Zone, 26 Dec. 1923, *Standley 28333* (US); near beach, Balboa, Canal Zone, Nov. 1923-Jan. 1924, *Standley 32150* (US); open bank, Darien Station, Canal Zone, 19 Jan. 1924, *Standley 31521* (US).

WEST INDIES: HAITI—vicinity of Port au Prince, 1-2 April 1920, *Leonard 3457* (US); vicinity of Mission, Fonds Varettes, about 1000 m. alt., 17 April-4 May 1920, *Leonard 3612* (US); Port au Prince, 150 m. alt., 21 Oct. 1924, *Ekman H 2207*

(US); stream near the West Indies Co., vicinity of St. Michel de L'Atalaya, Dept. du Nord, 350 m. alt., 17 Nov. 1925, *Leonard 7079* (US); cultivated slope 6 miles north of L'Atalaya Plantation, vicinity of St. Michel de L'Atalaya, Dept. du Nord, 350 m. alt., 26 Dec. 1925, *Leonard 8478* (F, US); among rocks on bare hill near shore east of Bord de Mer, vicinity of Jean Rabel, 6 March 1929, *Leonard & Leonard 13792* (US); rocky slopes, east bank of River Cotes de Fer, vicinity of Jean Rabel, 31 Jan. 1929, *Leonard & Leonard 12714* (US); SANTO DOMINGO—without definite locality or date, *Bertero* (M); Rincon, Prov. Barahona, Oct. 1911, *Fuertes 1301* (K, US, V); JAMAICA—Kingston Street, 9 Dec. 1890, *Hitchcock* (M); Kingston, Nov. 1849, *Prior* (K); CURACAO—fields near Willemstad, 20–27 March 1913, *Britton & Shafer 2914* (F, US); without definite locality, 17 Feb. 1917, *Curran & Haman 29* (US); PORTO RICO—on the Adjuntas road, four miles from Ponce, 21 Nov. 1902, *Heller 6091* (ANSP, F, M, US); Rincon, near Calvarche, 7 Dec. 1886, *Sintenis 5620* (M, US); Coamo, 4 Nov. 1885, *Sintenis 2693* (US); San Idelfonso, Coamo Springs Road, 22 Nov. 1899, *Goll 704* (US); CUBA—eastern Cuba, 1859–60, *Wright 208* (V); Prov. Pinar del Rio, Baños San Vicente, 12–16 Sept. 1910, *Britton, Britton & Gager 7393* (F, US); Prov. Pinar del Rio, base of Sierra Guana, 26 Nov. 1911, *Shafer 10557* (F, M, US); side of trail, Prov. Pinar del Rio, Sierra Caliente, south of Sumidero, 15–16 Aug. 1912, *Shafer 13738* (ANSP, US).

SOUTH AMERICA: COLOMBIA—without definite locality or date, *Andrè 514* (K); Mayquetia, *Oslo 439* (V); Santa Marta, 250 ft. alt., Aug. 1898–1901, *Smith 477* (ANSP, F, M, US); La Manuelita, near Palmira, eastern side of Cauca Valley, State of Cauca, 1100–1302 m. alt., Dec. 1905–Jan. 1906, *Pittier 826* (US); Sierra de la Teta, without date, *Dawe 559* (K, US); vicinity of Cartagena, 1919, *Heriberto 23* (US); vicinity of Cartagena, 1919, *Heriberto 137* (US); Dept. Bolivar, vicinity of Cartagena, 2–5 Nov. 1926, *Killip & Smith 14042* (US); Palmos de Varela, Barranquilla and vicinity, 20 Dec. 1929, *Elias 779* (US); VENEZUELA—near Colonia del Tovar, 1854–55, *Fendler 453* (M); waste places, Lower Catuche Wood above Caracas, 1000–1200 m. alt., 2 Sept. 1917, *Pittier 7350* (US); vicinity of Valencia, State of Carabobo, 400–800 m. alt., 16 Aug. 1920, *Pittier 9027* (US); Curucuti, near Maiquetia, 1 June 1922, *Pittier 10352* (US); Las Mostazas, Miranda, on railroad beyond Los Teques, 963 m. alt., *Allart 188* (US); PERU—near Tarapoto, eastern Peru, 1855–6, *Spruce 4922* (K, V); Tarapoto, Dec. 1904, *Ule 6646* (K); Dept. Puna, Tablazo River, northeast of Talara, 29 March 1929, *Haught 217* (US); plain southeast of Hacienda La Choza, Tumbes, 100–200 m. alt., 28 Feb.–3 March 1927, *Weberbauer 7700* (US); ECUADOR—in tropical region, near Guayaquil, June 1928, *Mille 171* (US); oil camp between Guayaquil and Salinas, Prov. Guayas, 0–100 m. alt., 21–24 June 1923, *Hitchcock 20053* (US); Chanduy, without date, *Spruce 6463* (V); BOLIVIA—subtropical region, Milluguaya, Nord Yungas, 1300 m. alt., Dec. 1917, *Buchtien 4357* (US); vicinity of Cochabamba, 1890, *Bang 748* (F); Bermejo, 1400 m. alt., 2 Dec. 1903, *Fiebrig 2316* (K); BRAZIL—Cera, on low ground in interior of state, 26 May 1929, *Bolland 31* (K).

SECTION II. BARTONIA Torrey & Gray

Section II. BARTONIA Torrey & Gray, Fl. N. Am. 1: 534. 1840; Brewer & Watson, Bot. Calif. 1: 236. 1876; Gilg in Engl.

& Prantl, Nat. Pflanzenfam. 3^{6a}: 111. 1894; Urban & Gilg in Nov. Act. Nat. Cur. [Abh. K. Leop.-Carol. Deutsch. Akad. Naturf.] 76: 85. 1900.

Biennials or perennials; stems smooth or scabrous; leaves sessile, rarely petiolate, sinuate-dentate to deeply pinnatifid; flowers yellow, rarely white, often large, showy; petals 5 or 10; filaments numerous, 30–200, the outer filaments more or less dilated to petaloid and sterile; capsule oblong to turbinate, broad, attenuated, sessile to subsessile; placentae broad horizontal lamellae; seeds 50–80, in 2 series, horizontal, flattened, suborbicular-winged, granulate-punctate to almost smooth, opaque. Spp. 20–46.

KEY TO THE SPECIES OF SECTION BARTONIA

- A. Calyx-lobes long (10–40 mm. long).
 - B. Outer 5 filaments petaloid; floral bracts adnate to the calyx-tube.
 - C. Flowers large; petals 50–80 mm. long.....20. *M. decapetala*
 - CC. Flowers small; petals 20–35 mm. long.....21. *M. stricta*
 - BB. Outer filaments usually not petaloid; floral bracts free from the calyx-tube.
 - C. Petals 15–20 mm. long; capsule 15–20 mm. long.....23. *M. Brandegei*
 - CC. Petals 50–80 mm. long; capsule 30–40 mm. long.....22. *M. laevicaulis*
- AA. Calyx-lobes short (2–15 mm. long).
 - B. Capsule erect.
 - C. Outer filaments petaloid.
 - D. Leaves entire or slightly dentate.
 - E. Stem pubescent.
 - F. Leaves linear-oblong; stem and leaves persistently white-pubescent.
 - G. Leaves thick, margins revolute, grayish-green...28 *M. leucophylla*
 - GG. Leaves thin, margins not revolute, pale green....43. *M. oreophila*
 - FF. Leaves oblanceolate to ovate; stem and leaves not persistently white-pubescent42. *M. integra*
 - EE. Stem smooth, polished.
 - F. Petals spathulate, 10 mm. long.....24. *M. polita*
 - FF. Petals oblanceolate, 6–8 mm. long.....25. *M. argillosa*
 - DD. Leaves sinuate-dentate to pinnately toothed or lobed.
 - E. Flowers distinctly yellow.
 - F. Flowers greenish-yellow.....46. *M. lutea*
 - FF. Flowers lemon-yellow to golden.
 - G. Upper leaves entire, lower leaves pinnatifid....29 *M. multicaulis*
 - GG. Upper and lower leaves pinnatifid or lobed.
 - H. Plants caespitose.....26 *M. perennis*
 - HH. Plants not caespitose.

- I. Petals obtuse.
 - J. Capsule 15–20 mm. long, base acute.....36. *M. multiflora*
 - JJ. Capsule 8–15 mm. long, base rounded.
 - K. Anthers minutely scabrous.....41. *M. pterosperma*
 - KK. Anthers glabrous.
 - L. Stems scabrous; calyx-lobes 6–8 mm. long.....
 -45. *M. puberula*
 - LL. Stems nearly glabrous; calyx-lobes 9–11 mm. long
 -44. *M. longiloba*
- II. Petals acute.
 - J. Capsule 7–10 mm. long.....27. *M. humilis*
 - JJ. Capsule 10–20 mm. long.
 - K. Leaves small, mostly less than 6 cm. long; petals 15 mm. or less long.
 - L. Stem simple at base; lobes of leaves short, broadly oblong.
 - M. Capsule 15–20 mm. long.....37. *M. pumila*
 - MM. Capsule 10–12 mm. long..37a. *M. pumila* var. *procera*
 - LL. Stem branched at base; lobes of leaves narrowly linear-lanceolate30. *M. densa*
 - KK. Leaves large, more than 5 cm. long; petals 15 mm. or more long.
 - L. Stem erect at base; leaves divided to near midrib, lobes linear-oblong.....40. *M. laciniata*
 - LL. Stem decumbent at base; leaves divided halfway to midrib, lobes ovate to triangular..38. *M. chrysantha*
 - EE. Flowers pale yellow to nearly white.
 - F. Petals 15–50 mm. long.
 - G. Petals 15–22 mm. long.
 - H. Lower leaves 10–20 cm. long, lanceolate, upper leaves broad at base39. *M. Rusbyi*
 - HH. Lower leaves less than 5 cm. long, upper leaves attenuated, mostly entire, crowded.....35. *M. strictissima*
 - GG. Petals 20–50 mm. long.....34. *M. nuda*
 - FF. Petals 70–80 mm. long.....33. *M. albescens*
 - CC. Outer filaments linear, not petaloid.....31. *M. Torreyi*
 - BB. Capsule reflexed.....32. *M. reflexa*

20. *M. decapetala* (Pursh) Urban & Gilg in Ber. Deut. Bot. Ges. 10: 263. 1892; in Engl. & Prantl, Nat. Pflanzenfam. 3^{6a}: 111. 1894, and ed. 2, 21: 534. 1925; Britton & Brown, Ill. Fl. 2: 459. 1897; Urban & Gilg in Nov. Act. Nat. Cur. [Abh. K. Leop.-Carol. Deutsch. Akad. Naturf.] 76: 89. 1900; Gray, Man. Bot. ed. 7. 588. 1908; Coulter & Nelson, Man. Bot. Rocky Mts. 324–325. 1909; Wootton & Standley in Contr. U. S. Nat. Herb. [Fl. N. Mex.] 19: 432–434. 1915; Rydb. Fl. Rocky Mts. & Adj.

Plains, 570–572. 1922; Tidestrom in Contr. U. S. Nat. Herb. [Fl. Utah & Nev.] 25: 362–363. 1925.

M. ornata Torr. & Gray, Fl. N. Am. 1: 534. 1840.

Bartonia decapetala Pursh in Sims, Bot. Mag. 36: pl. 1487. 1812.

Bartonia ornata Pursh, Fl. Am. Sept. 1: 327. 1814; Nutt. Gen. 1: 297. 1818.

Bartonia superba Barton, Fl. N. Am. 3: pl. 81. 1823.

Torreyia ornata Eaton, Man. Bot. ed. 7, 560. 1836; Wats. Bibl. Index, 391. 1878.

Hesperaster decapetalus (Pursh) Cockerell in Torreyia 1: 142. 1901.

Toutheria ornata Eaton & Wright, N. Am. Bot. 454. 1840; Wats. Bibl. Index, 391. 1878.

Toutheria decapetala Rydb. in Bull. Torr. Bot. Club 30: 276. 1903.

Nuttallia decapetala Greene in Leaflets Bot. Obs. & Crit. 1: 216. 1906.

Perennial from a long succulent fusiform root, stout, coarse, scabrous; stems solitary, erect, branched above 3–10 cm. high, striate to subangular, pale yellow to yellowish-brown, scabrous the entire length, with short closely appressed, ascending verticillate glochidiate and spine-like hairs; leaves alternate, lanceolate to oblong-lanceolate, 5–15 cm. long, acute, sharply and interruptedly sinuate-pinnatifid, upper sessile, lower narrowed to a petiolar base, upper and lower surfaces harsh and scabrous with stout appressed spine-like hairs; flowers usually solitary, sessile, terminal, large, yellowish-white and odorous, subtended by several deeply pinnatifid, long-attenuated bracts extending to about one-half the length of the calyx-lobes; calyx-tube oblong to turbinate-oblong, 20–30 mm. long, bracteolate, canescent, densely scabrous with long verticillate glochidiate and spine-like hairs; calyx-lobes 5, lanceolate, 25–40 mm. long, long-acuminate, persistent, with prominent midvein, inner surface pilose, outer surface with short stiff appressed verticillate spine-like hairs; petals 10, pale yellow to almost white, concave, lanceolate-ovate, acute at the apex, spreading, unguiculate, sparsely pilose at the apex,

about twice the length of the calyx-lobes, inner 5 somewhat smaller, representing petaloid staminodia; filaments numerous (200), filiform, erect, in 4-5 series, 3.5-4.5 cm. long, anthers linear to oblong-linear, base emarginate, not contorted; style equalling length of stamens, filiform, angled, 5-7-parted, papillose at the apex and margins, early deciduous in the fruit; capsule oval to oblong, 3-4 cm. long, obtuse, attenuated toward the base, brownish-gray, scabrous, many-nerved, crowned by more or less erect persistent calyx-lobes; seeds in 2 series, horizontal, numerous, margined but not winged, obovate, 3 mm. long, convex, grayish-brown, minutely granulate-punctate.

Distribution: plains and foothills from western Iowa northward to Canada and Montana, south to Mexico.

Specimens examined:

INDEFINITE LOCALITY; Northwest Territory, Nicollet Expedition, *Geyer 200* (ANSP, M); Simpson's Cut, 7 July 1859, *Simpson's Expedition* (M); Missouri, *Rafinesque* (ANSP); banks of Missouri, 15 Sept. 1864, *Rothhammer 508* (US).

IOWA: Sioux City, 29 Aug. 1896, *Pammel 25* (CAS, F, M, RM, US).

NORTH DAKOTA: Medora, 9 Sept. 1891, *Wright* (RM); without definite locality, Sept. 1898, *Westergaard* (RM); Medora, Aug. 1909, *Bailey* (US); clay bluffs near Bismarck, 13 Aug. 1927, *Larsen 167* (ANSP, M).

SOUTH DAKOTA: common on sand hills, *Skinner 215* (RM); banks of Cheyenne River, Smithville, 8 Aug. 1891, *Williams* (M); Forest City, Aug. 1892, *Griffiths* (M, US); Running Water, Sept. 1892, *Thornber 1384* (M, US); Hot Springs, 3500 ft. alt., 9 Aug. 1892, *Rydberg 713* (US); Hot Springs, Sept. 1893, *Safford* (US); Hot Springs, 27 Aug. 1898, *Williams* (ANSP); bluffs of Missouri River, Evarts, 30 Aug. 1906, *Moyer 2520* (RM); South Cave Hills, Aug. 1910, *Fromme* (M); clay banks, Slim Buttes, Harding Co., 21 Aug. 1910, *Visher 251* (F, RM); along cut banks, Spearfish Beds, 7 miles west of Rapid City, 10 Aug. 1925, *Lee* (RM).

NEBRASKA: prairies, Belmont, *Weber* (M); on Missouri, near Yankton to St. Helena, *Bruhin* (M); common on bluffs and sand hills, Fort Pierre, 1854, *Hayden 40* (M); Grand Rapids, 18 Aug. 1893, *Clements 2843* (US); Muddy Gulch, Scotts Bluff Co., 3 Aug. 1900, *Baker* (M); clayey soils, Sioux Co., Aug.-Sept. 1927, *Kramer 201* (M); Franklin Co., 25 Aug. 1929, *Hapeman* (ANSP).

KANSAS: limestone hills, near Bogue, *Imler 49* (M); without definite locality, Sept. 1885, *Oyster 2801* (CAS); Rockport, 20 Aug. 1889, *Bartholomew* (M); naked clays of bluffs, Caldwell, 10 Sept. 1890, *Smyth 274* (US); red clay bluffs near river, Medicine Lodge, 12 Sept. 1890, *Smyth 299* (US); stony hills, Morton Co., 6 Aug. 1895, *Hitchcock 175* (M, RM, US).

OKLAHOMA: near Alva, 12 Oct. 1896, *Ward 53* (US); sandy open ground, Altus, Jackson Co., 26 Oct. 1917, *Palmer 13072* (M); near Duke, Jackson Co., 5 Aug. 1927, *Stratton 311* (M).

TEXAS: banks of Fish Creek, Dallas Co., Aug. 1897, *Reverchon 325* (F, M, US); banks of Fish Creek near Dallas, *Reverchon 959A* (CAS, F, M, US); Fish Creek, Dallas, July 1879, *Reverchon* (F); cultivated at Dallas, Aug. 1882, *Letterman 140* (M, US); Dallas, 450 ft. alt., 20 July 1882, *Letterman 171* (M); low sandy brakes, Chillicothe, 27 Sept. 1906, *Ball 1161* (US); sandy soil, Garza Co., Oct. 1923, *Ruth 1150* (US); dry banks of canyon, Post, Garza Co., *E. J. Palmer 14562* (M); Spur, 19 Oct. 1930, *Reed 3241* (US).

CANADA: Alberta, Medicine Hat, Assiniboia, Aug. 1895, *Macoun 10650* (US).

MONTANA: indefinite locality, without data, *Fitch* (D, P, RM); *Fitch 39* (RM); *Fitch 77* (M); Great Falls, 1 Aug. 1885, *Anderson 161* (UM); Great Falls, 27 Aug. 1886, *Williams 54* (US); indefinite locality, 27 July 1890, *Blankinship 99* (US); Colgate, 6 Sept. 1892, *Sandberg, MacDougal & Heller 1033* (CAS, US); Glendive, Sept. 1892, *Sandberg* (P, RM); near St. Peters Hospital, Helena, July 1894, *Starz* (M); Emigrant Gulch, 6500 ft. alt., 22 Aug. 1897, *Rydberg & Bessey 4545* (F, US); Deep Creek Canyon, Big Belt Mts., 14 Aug. 1899, *Blankinship* (P, RM); Gardiner River, 26 July 1902, *Mearns 2333* (US); Harr, 15 Aug. 1902, *Mearns 3289* (US); sandy draw, Great Falls, 3000 ft. alt., 28 July 1906, *Blankinship 697* (F, UM, US); cut bank, 3 Sept. 1921, *Wooton* (US).

WYOMING: Fort Union, Yellowstone Park, 1852, *Carrey* (US); Smith's Fork, Yellowstone River, 10 May 1860, *Hayden* (M); Hot Springs, north of Gardiner, 26 July 1888, *Knowlton* (US); Big Horn Mts., Aug. 5, 1892, *Buffum 347* (RM); near Mammoth Hot Springs, Yellowstone Park, 6000 ft. alt., July 1893, *Burglehaus* (M, US); Fairbanks, 14 July 1894, *Nelson 486* (M, US); Platte River, 14 July 1894, *Nelson 3019* (RM); Parkman, 22 July 1896, *Nelson 2456* (RM); Devils Tower, 17 Aug. 1897, *Griffiths* (CAS, RM); Buffalo, 4000–5000 ft. alt., Oct. 1900, *Tweedy 3618* (RM); ditch banks, Jelm, Albany Co., 12 Aug. 1900, *Nelson 8074* (M, P, RM, US); railroad grade, Moorcraft, 2 July 1901, *Nelson 8549* (RM); Yellowstone Park, Aug. 1901, *Martin* (P); rocky hillsides, Red Bank, Big Horn Co., 22 July 1901, *Goodding 477* (M, P, RM, US); Fort Yellowstone, 28 July 1902, *Smith 102* (US); Mammoth Hot Springs, Yellowstone Park, 1900 m. alt., 28 July 1902, *Mearns 2357* (US); Mammoth Hot Springs, Yellowstone Park, 2 Aug. 1902, *Mearns 2754* (D, US); near Mammoth Hot Springs, Yellowstone Park, 4 Aug. 1902, *Mearns 2825* (US); near Mammoth Hot Springs, 1 mile post, Yellowstone Park, 1793 m. alt., 30 July 1902, *Mearns 2514* (US); hills southeast of Sheridan, 14 July 1913, *Sharp 380* (RM); hillside above Madison's Ranch, Clark, 4000 ft. alt., 3 Aug. 1925, *Pearson 279* (RM); New Haven, 1926, *Stinson 2* (RM).

COLORADO: Monument Park, without date, *Walker* (F); Leadville, without date, *Schedin* (RM); near Canyon City, 1874, *Brandegge* (ANSP, F, M); marl hills at Pueblo, 6 Sept. 1881, *Engelmann* (M); Pueblo, 1889, *Evermann* (US); Boulder Canyon, 2 miles west of Boulder, 4 Sept. 1892, *Baker* (P); Fort Collins, 10 June 1894, *Baker* (P); sandy creek bottoms, 7000 ft. alt., 10 Sept. 1900, *Vreeland 660* (RM); foothills near Fort Collins, Aug. 1900, *Smith* (US); plains west of Loveland, Larimer Co., 21 July 1900, *Osterhout 2204* (P, RM, US); plains and foothills near Boulder, 5000–6000 ft. alt., July 1902, *Tweedy 5144* (RM); dry hills, Greenhorn, Pueblo Co., 1900 m. alt., 2 Sept. 1921, *Clokey 4218* (ANSP, CAS, D, F, M, P, RM, US); Pawnee Buttes, Sligo, 2 Aug. 1925, *Johnston 133* (RM).

NEW MEXICO: prairies between Red River & Rock Creek, 21 Aug. 1847, *Fendler*

240 (C, M); Bear Canyon, Raton Range, 10 Sept. 1903, *Howell 189* (US); Colfax, 13 Aug. 1910, *Wooton* (US).

IDAHO: Salmon, Salmon River, 31 Aug. 1895, *Henderson 3948* (US).

MEXICO: Sonora, ex herbarium *Dr. Torrey* (US).

21. *M. stricta* (Osterhout) Stevens ex Jeffs & Little in Publ. Univ. Okla. Biol. Surv. [Prelim. List Ferns & Seed Pl. Okla.] 2: 73. 1930; Coulter & Nelson, Man. Bot. Rocky Mts. 325. 1909 (in synonymy under *M. nuda* (Pursh) T. & G.).

Hesperaster strictus Osterhout in Bull. Torr. Bot. Club 29: 174. 1902.

Toutereia stricta Osterhout in Bull. Torr. Bot. Club 30: 276. 1903; Rydberg, Fl. Colo. 236. 1906.

Nuttallia stricta Greene in Leaflets Bot. Obs. & Crit. 1: 210. 1906; Wooton & Standley in Contr. U. S. Nat. Herb. [Fl. N. Mex.] 19: 435. 1915; Rydb. Fl. Rocky Mts. & Adj. Plains, ed. 2. 572. 1922; Rydb. Fl. Prairies & Plains Cent. N. Am. 557. 1932.

Perennial, strict, branching above, scabrous with spine-like and verticillate glochidiate hairs; stems whitish, somewhat striated, hispid, 5–10 dm. high, leafy; leaves sinuate-dentate, linear to oblong-lanceolate, hispid on upper and lower surfaces with short stout barbed spine-like pustulate hairs; basal leaves 7–10 cm. long, obtuse, shortly petiolate, upper leaves smaller, sessile, apex acuminate, base cuneate; flowers corymbose, small, mostly solitary, pale yellow, subtended by several laciniate acuminate bracts; calyx-tube 10–15 mm. long, tapering when young, hispid, almost entirely concealed by bracts; calyx-lobes deltoid-acuminate, 10–20 mm. long, hispid, occasionally laciniately divided, simulating a subtending bract; petals 10, 2–3.5 cm. long, oblanceolate, acute, narrowed to a claw about one-third of the length; outer filaments dilated, antheriferous, nearly equalling length of petals, inner filaments filiform, in several series, less than half the length of outer ones, anthers oblong, 1 mm. long, glabrous; style 2 cm. long, slender, deeply 3-parted to two-thirds of its length, glabrous; capsule stout, oblong-cylindric, 2–3 cm. long, ribbed or striated, hispid, yellowish-brown, crowned with the withered persistent

calyx-lobes and style; seeds numerous, flattened, obovate, 4-5 mm. long, wing-margined, minutely muriculate.

Distribution: plains and foothills from South Dakota to Texas, west to southern Montana and New Mexico.

Specimens examined:

SOUTH DAKOTA: indefinite locality, *Skinner 215a* (RM); Iron Springs, Bad Lands, 28 Aug. 1889, *Williams & Wilcox 372* (US); Hot Springs, 3500 ft. alt., 3 Aug. 1892, *Rydberg 714* (US); Hot Springs, Aug. 1893, *Macbride* (F, M); Hot Springs, Aug. 1898, *Williamson* (ANSP); clay banks, Shannon Co., 29 July 1924, *Over 15843* (RM); along draws, on plains, Fall River Falls, Hot Springs, 23 July 1924, *McIntosh 510* (RM); hillsides near Cascade Springs, Fall River Co., 24 Aug. 1925, *Over 16996* (RM); Rocky Valley, Hill Canyon, 8 miles northeast of Dewey, 28 July 1927, *Hayward 2444* (RM).

NEBRASKA: indefinite locality, 12 July 1851, *Hayden* (M); South Platte to Pale Creek, July 1856, *Engelmann* (M); on the Running Water, Sheridan Co., 1-10 July, 1886, *Hatcher* (C); Pine Ridge, 25 July 1889, *Webber* (M); prairies, Belmont, Dawes Co., 25 July 1889, *Webber* (US); sand draws, Deuel Co., Aug. 1890, *Rydberg* (US); McColligan Canyon, 22 Aug. 1891, *Rydberg 123* (US); Turner, 24 July 1893, *Clements 2772* (US); South Fork of Dismal River, 14 Aug. 1893, *Rydberg 1689* (US); Bridgeport, Cheyenne Co., 3700 ft. alt., 6 Aug. 1901, *Baker* (M); Scotts Bluff Co., 4100 ft. alt., 13 Aug. 1901, *Baker* (M); dry clay slopes along Lincoln Highway near Deep Spring, 27 Aug. 1926, *Heller 14296* (D, M); sandy prairies, July-Sept. 1927, *Kramer 166* (M).

KANSAS: Wallace Co., *Snow* (C, US); Arkalon, sand hills, 16 Aug. 1890, *Smyth 147* (US); Medicine Lodge, above bluffs, 12 Sept. 1890, *Smyth 307* (US); Gray Co., June 1891, *Carleton 328* (F); Syracuse, 19 July 1893, *Thompson 123* (C, M, US); Seward Co., Sept. 1893, *Gurney* (M); prairie, Logan Co., 27 July 1895, *Hitchcock 176* (M, RM, US); sand hills, Finney Co., 11 Aug. 1895, *Hitchcock 177* (US); Belvidere, 19 Sept. 1897, *Ward* (US); vicinity of Tribune, 18 Sept. 1912, *Rose & Fitch 17083* (US); sand hills, 13 miles southwest of Lakin, 13 July 1929, *Rydberg & Imler 912* (M).

OKLAHOMA: Greer Co., 19 July 1901, *White* (RM); sandy open places, Frederick, 4 July 1903, *Duncan 37* (M); near Fairvalley, Woods Co., 15 July 1913, *Stevens 1714* (D, M, US); near Alva, Woods Co., 23 July 1913, *Stevens 1765* (D, M, US); near Alva, Woods Co., 24 Sept. 1913, *Stevens 2843* (M, US); sandy open ground, Ryan, Jefferson Co., 22 July 1917, *E. J. Palmer 12603* (M); sandy soil near Headrick, Jackson Co., 25 Aug. 1927, *Stratton 306* (M).

TEXAS: *Fremont's Expedition 177* (M); indefinite locality, *Berlandier 590, 2000* (M); Vernon, *Reverchon* (M); Fort Smith to Rio Grande, 1853-54, *Bigelow* (US); bank of Brazos, Seymour, Baylor Co., Sept. 1897, *Reverchon 324* (F, M, US); western Texas, Aug. 1881, *Havard* (US); Canadian, 26 Aug. 1892, *Bailey* (US); prairies, Canadian, Hemphill Co., 11 Aug. 1900, *Eggert* (M); prairies north of Stanton, Martin Co., 13 June 1900, *Eggert* (M); prairies, north of Colorado, Mitchell Co., 9 June 1900, *Eggert* (M); Colorado, 16 Oct. 1902, *Tracy 8337* (F, M, US); Lelia, 25 June 1902, *Reverchon* (M); sandy plains, Estelline, 9 July 1903, *Reverchon 3836* (M, P, US); Texline, 6 Aug. 1903, *Howell 135* (US);

prairies, north of Vernon, Wilbarger Co., 18 Sept. 1903, *Eggert* (M); Palo Duro Canyon, Randall Co., 2 Sept. 1907, *Ball 1212* (US); Sweetwater, 31 Oct. 1913, *Wooton* (US); sandy open ground, Fredericksburg, Gillespie Co., 5 June 1916, *E. J. Palmer 10058* (M); dry open ground, Sweetwater, Nolan Co., 21 Oct. 1917, *Palmer 13048* (M); Pease River bottoms near Vernon, Wilbarger Co., 20 Aug. 1921, *Ferris & Duncan 3351* (CAS, M); 17 miles south of San Antonio, May 1921, *Schulz 573* (US); sandy waste ground, Garza Co., 30 June 1924, *Ruth 1204* (CAS); near Posey Canyon, Lubbock Co., 4 June 1930, *Demaree 7768* (M); Slaton, 24 Sept. 1930, *Reed 3230* (US).

MONTANA: Clear Creek, 14 miles above Glendrive, 25 July 1883, *Ward* (US); Glendrive, July 1892, *Aiton* (ANSP, D, F, RM).

WYOMING: head of Big Sandy, 18 July 1891, *Buffum 345* (RM); Grant, 8 July 1894, *Nelson 338* (M, RM, US); Cummins, 28 July 1895, *Nelson 1470* in part (P); Lance Creek, 10 July 1896, *Knowlton 165* (US); Deer Creek, Converse Co., 14 July 1901, *Nelson 8408* (M, RM, US); indefinite locality, 1901, *Nelson* (RM); New Castle foothills, 9 July 1927, *Hayward 2046* (RM).

COLORADO: Denver, *Smith*, (ANSP); Clear Creek, 1862, *Hall & Harbour 569* (ANSP, F); indefinite locality, 1862, *Hall* (US); Colorado Springs, Aug. 1871, *Meehan* (ANSP); Canyon City, 1871, *Brandegge 89* (C, M); plains near Denver, 20 Aug. 1871, *Smith* (ANSP); Platte River bottom, Denver, 17 July 1872, *Redfield 464* (ANSP, M); divide between Denver and Colorado Springs, 20 Sept. 1874, *Engelmann* (M); Middle Park, 1875, *Patterson* (F); Boulder, 1 Sept. 1875, *Henry* (M); along the Platte River, Denver, 5000 ft. alt., 20 Aug. 1878, *Jones 661* (P); Hot Springs, Canyon City, 30 Aug. 1881, *Engelmann* (M); Platte Valley below Greeley, 3 Aug. 1881, *Ward* (US); near Denver, 5200 ft. alt., Aug. 1884, *Letterman 169* (F, M); Manitou, 10 Aug. 1884, *Letterman* (M); Colorado Springs, 1886, *Bartlett* (C); Breckenridge, 1887, *Bereman 734* (M); Pueblo, 1889, *Evermann* (US); Colorado Springs, Sept. 1892, *Mulford* (M); Fort Collins, 5000 ft. alt., 29 July 1892, *Crandall* (M); rocky slopes, Manitou, El Paso Co., 6400 ft. alt., 4 Aug. 1892, *Sheldon 426* (US); Fort Collins, 5000 ft. alt., 4 July 1893, *Baker* (P); river flats, Fort Collins, 5000 ft. alt., 26 Aug. 1895, *Cowen 180* (US); Fort Collins, 5000 ft. alt., 6 July 1896, *Baker* (M, P); Boulder, 1896, *Andrews* (P); Denver, 1897, *Wislizenus* (M); plains near Denver, 5170 ft. alt., July 1899, *Holm* (M); dry plains near foothills, 5300 ft. alt., 11 Aug. 1899, *Crandall 1212* (C, F, UM); prairies near foothills, 26 July 1899, *Marshall 1213* (RM, US); New Windsor, Weld Co., 29 July 1899, *Osterhout* (CAS, RM); Windsor, Weld Co., 29 July 1900, *Osterhout 2320* (ANSP, P); Colorado Springs, July 1900, *Harper* (M); Manitou, July 1900, *Harper* (C); New Windsor, Weld Co., 3 July 1900, *Osterhout 2321* (US); near Greeley, Weld Co., Aug. 1901, *Osterhout 2488* (ANSP, RM); New Windsor, Weld Co., 11 July 1901, *Osterhout 2488* (P, US); Colorado Springs, 6000 ft. alt., 27 Aug. 1902, *Cooper 425* (RM); plains and foothills near Boulder, 5000 ft. alt., Oct. 1902, *Tweedy 5145* (RM); plains and foothills near Boulder, 5000–6000 ft. alt., July 1902, *Tweedy 5146* (RM); New Windsor, Weld Co., 19 July 1904, *Osterhout 2917* (RM); New Windsor, Weld Co., 4 Aug. 1905, *Osterhout* (RM); South Cheyenne Canyon, 11 Sept. 1905, *Glatfelter* (M); Hugo, 26 Aug. 1907, *Tidestrom 56* (US); Flagstaff Mt., near Boulder, 14 Aug. 1906, *Robbins 2572* (RM); along the railroad, near Boulder, 8 Aug. 1906, *Robbins 2534* (RM); plains, Boulder, 5300 ft. alt., 31 July 1906, *Daniels 678* (M); Hugo, 5 Aug. 1907, *Tidestrom 56* (US); Hugo, 24

Sept. 1907, *Tidestrom* 667 (US); Colorado Springs, 1908, *Pace* 436 (M); Littleton, Aug. 1909, *Clemens* (P, RM); plains, North Denver, 20 Sept. 1910, *Eastwood* (C); dry soil, Denver, 15 July 1910, *Blake* 349 (RM); plains, North Denver, 20 Sept. 1910, *Eastwood* 152 (CAS, M, US); arid plains, North Denver, 2 Aug. 1910, *Eastwood* 16 (CAS, C, M, US); Windsor, Weld Co., 1 Aug. 1911, *Osterhout* (P); Boulder, Boulder Co., 19 Aug. 1912, *Vestal* 464 in part (P); prairie, Pike's Peak region, 20 Aug. 1912, *Brumback & Davies* 96b (F); vicinity of La Junta, 16 Sept. 1912, *Rose & Fitch* 13069 (US); dry soil, Denver, 5300 ft. alt., 9 Aug. 1915, *Clokey* 2628 (RM); dry soil, Denver, 5100 ft. alt., 5 Aug. 1916, *Clokey* (D, F); Windsor, Weld Co., 1 Aug. 1916, *Osterhout* (RM); vacant lot, North Denver, 19 Aug. 1919, *Bethel & Payson* 1616 (M, RM); Wray, Yuma Co., 1100 m. alt., 11-15 Aug. 1919, *Eggleston* 15542 (F, P); Florence, Fremont Co., 1000 m. alt., 2-5 Aug. 1919, *Eggleston* 15417 (F); prairie, Denver, 5300 ft. alt., 2 Sept. 1917, *Clokey* 2947 (CAS, F, RM, US); dry prairie, Denver, 1616 m. alt., 7 Sept. 1920, *Clokey* 3822 (ANSP, CAS, D, F, M, P, RM, UM, US).

NEW MEXICO: without definite locality, coll. of 1847, *Fendler* 241 (M); Cross L Ranch, Cimarron Canyon, 21-24 Aug. 1903, *Griffiths* 5548 (US); northeast of Clayton, 19 Aug. 1910, *Wooton* (US); Nara Vista, 7 Oct. 1910, *Fisher* 95 (US); Nara Vista, 10 July 1914, *Wooton* (US).

22. *M. laevicaulis* (Dougl.) Torrey & Gray, Fl. N. Am. 1: 535. 1840; Watson, U. S. Geol. Surv. Fortieth Parallel [Bot. King's Exp.] 5: 114. 1871; Brewer & Watson, Bot. Calif. 1: 237. 1876; Coulter, Man. Bot. Rocky Mt. Region, 107. 1885; Greene, Fl. Francisc. 234. 1891; Greene, Man. Bot. Reg. San Francis. Bay, 142. 1894; Gilg in Engl. & Prantl, Nat. Pflanzenfam. 3^{6a}: 111. 1894; Howell, Fl. N. W. Am. 1: 241. 1897; Britton & Brown, Ill. Fl. 2: 459. 1897; Urban & Gilg in Nov. Act. Nat. Cur. [Abh. K. Leop.-Carol. Deutsch. Akad. Naturf.] 76: 87. 1900; Jepson, Fl. West. Mid. Calif. 323. 1901; Abrams, Fl. Los Angeles & Vic. 256. 1904; Piper in Contr. U. S. Nat. Herb. [Fl. Wash.] 11: 395. 1906; Coulter & Nelson, Man. Bot. Rocky Mts. 326. 1909; Piper & Beattie, Fl. Southeast. Wash. & Adj. Idaho, 166. 1914; Rydb. Fl. Rocky Mts. & Adj. Plains, ed. 2. 570-572. 1922; Tidestrom in Contr. U. S. Nat. Herb. [Fl. Utah & Nev.] 25: 362-363. 1925; Jepson, Man. Fl. Pl. Calif. 649. 1925.

M. ornata Torrey in Rept. Stansb. Exped. 387. 1852, not Torrey & Gray.

M. laevicaulis (Dougl.) Torrey & Gray var. *acuminata* Nels. & Macbr. Contr. Gray Herb. 65: 40. 1922.

M. acuminata Tidestr. in Contr. U. S. Nat. Herb. [Fl. Utah & Nev.] 25: 362. 1925.

Bartonia laevicaulis Dougl. in Hook. Fl. Bor. Am. 1: 221, pl. 69. [1834] 1840; Hook. & Arn. Bot. Beechey Voy. Suppl. 343. 1843; Walp. Rep. 2: 224. 1843.

Bartonia parviflora Dougl. in Hook. Fl. Bor. Am. 1: 221. [1834] 1840.

Bartonia ornata Hook. in Lond. Jour. Bot. 6: 226. 1847, not Pursh.

Hesperaster laevicaulis Cockerell in Torreyia 1: 143. 1901.

Touteria parviflora Rydb. Bull. Torr. Bot. Club 30: 276. 1903.

Touteria laevicaulis Rydb. *Ibid.*

Nuttallia laevicaulis (Dougl.) Greene, Leaflets Bot. Obs. & Crit. 1: 210. 1906.

Nuttallia parviflora (Dougl.) Greene, *Ibid.*

Nuttallia acuminata Rydb. in Bull. Torr. Bot. Club 40: 61. 1913.

Perennial, coarse, stout; stems erect, 3–10 dm. high, branched, striate, shining white, nearly smooth below, scabrous with a few verticillate glochidiate and spine-like hairs above; leaves alternate, 3–15 cm. long, sessile, scabrous, canescent with short retrorse and antrorse spine-like hairs on upper surface, verticillate glochidiate hairs on lower surface; basal leaves oblanceolate, deeply pinnately lobed nearly to midvein, upper leaves ovate-lanceolate, acute or acuminate at apex, base subcordate, sinuate-pinnatifid; flowers 1–3, terminal, sessile, large, showy, pale yellow, expanding in bright sunshine, subtended by 1–3 linear-subulate irregularly toothed long-acuminate bracts; calyx-tube cylindrical, attenuated, 15–30 mm. long, densely scabrous; calyx-lobes lanceolate to ovate-oblong, acuminate, 20–40 mm. long, canescent, pubescent, reflexed and yellowish in fruit, conspicuous midnerve; petals 5, yellow, lanceolate or oblong-lanceolate, erect or spreading, 5–8 cm. long, narrowed at the base, acute or acuminate and slightly pilose at the apex, otherwise glabrous; stamens in 4–5 series, 2–4 cm. long, filaments antheriferous, 5 exterior filaments

dilated, somewhat petaloid, anthers not contorted, oblong-linear; style 3.5–6 cm. long, papillose, persistent and withered in fruit; capsule subcylindrical, slightly attenuated, obtuse at the base, 3–4 cm. long, scabrous, brownish-black, strongly striated, crowned by persistent recurved calyx-lobes and withered style; seeds numerous, in 2 series, short-obovate to obovate-rotund, 2–3.5 mm. long, winged, slightly convex, grayish-brown, minutely granulate-punctate, tuberculate.

Distribution: canyons, valleys, and dry foothills, from Montana westward to the Pacific Coast.

Specimens examined:

INDEFINITE LOCALITY: "Head of the Missouri" and "Columbia River Blue Mountains," *Nuttall* (ANSP); Franklin Gap, *Hooker* (ANSP TYPE); Fort Beaufort, *Havard* (F).

MONTANA: Hot Sulphur Springs, 24 July 1871, *Allen* (US); Sixteen Mile Creek, 4500 ft. alt., 10 July 1883, *Lamson-Scribner* 59, 60 (US); Helena, 24 July 1887, *Williams* 686 (US); Lower Falls of the Missouri, 18 Sept. 1887, *Williams* 727 (US); McCarthy, 1888, *Anderson* (US); bank of Big Hole River, near Willis, Oct. 1888, *Anderson* (UM); near Helena, 4 July 1891, *Kelsey* (F); Emigrant Gulch, 6500 ft. alt., 23 Aug. 1897, *Rydberg & Bessey* 4546 (F, US); East Flathead, 15 Aug. 1899, *Jones* (C, RM, US); Gardiner River, 2 Aug. 1902, *Mearns* 2761 (US); Yellowstone River near Gardiner, 6 July 1902, *Mearns* 1541 (US); Yellowstone River near Gardiner, 20 June 1902, *Mearns* 1259 (US); Gardiner River, 27 July, 1902, *Mearns* 2346 (US); Deer Lodge Valley, 5000 ft. alt., 28 July 1905, *Jones* (P); dry hillsides, Anaconda, 5000 ft. alt., 12 Aug. 1906, *Blankinship* 698 (C, F, M, RM, US); prairie, Lolo Valley, near Woodman, 9 July 1921, *Kirkwood* 1212 (M, UM); Yellowstone Trail between Tarkio & Superior, 2800 ft. alt., 12 July 1924, *Kirkwood* 1799 (UM); near East Entrance, Glacier Park, 30 June 1930, *Van Dyke* (CAS).

WYOMING: Hot Springs, 1872, *Platt* (US); dry creek bottom, North Fork Wind River, 12 July 1882, *Forwood* (US); Mount Evart, Yellowstone Park, 26 July *Tweedy* 95 (US); near Marquette, 4 Aug. 1892, *Rose* 118 (M, US); Garfield Peak, 1888, *Knowlton* (US); head of Big Goose Creek, Big Horn Mts., 15–24 July 1893, 29 July 1894, *Nelson* 678 (M, P, RM, US); Gardiner River, 19 July 1899, *A. & E. Nelson* 6000 (M, RM, US); plains between Sheridan and Buffalo, 3500–5000 ft. alt., 15 June–15 July 1900, *Tweedy* 3617 (RM); Meyer's Ranch, south of Evanston, Bear River, 7000 ft. alt., 26 July–1 Aug. 1902, *Pammel & Blackwood* 4046 (M); Gardiner River, near Ft. Yellowstone, 27 July 1902, *Smith* 98 (US); Mammoth Hot Springs, 29 July 1902, *Smith* (F); Gardiner River Mt., 2 Aug. 1902, *Mearns* 2761 (F); Yellowstone Park, 29 July 1902, *Mearns* 3652 (US); Yellowstone Park, 27 July 1902, *Mearns* 2356 (US); Slater, 20 July 1903, *Goodding* 1725 (RM, US); Holm Lodge, Aug. 1911, *Reynolds* 159 (F); Snake River below Jackson, Teton Co., 20 Aug. 1922, *Payson & Payson* 3081 (RM); Shoshone Canyon, 10 Aug. 1924, *Nelson* 10117 (M).

IDAHO: Ketchum, without date, *Broadhead* 22 (P); without definite locality or date, *Wissels* (US); Palouse country and about Lake Coeur d'Alene, June-July 1892, *Aiton* (F, M, P, RM, US); Snake River, 2 July 1892, *Mulford* (M); Post Falls, Kootenai Co., 14-17 July 1892, *Heller* 651 (ANSP, F); banks of Spokane River, Kootenai Co., 15 July 1892, *Sandberg*, *MacDougal* & *Heller* 651 (CAS, F, M, P, US); sandy banks, Kootenai Co., July 1892, *Sandberg* (C, F, M); shores of Lake Coeur d'Alene, 18 July 1895, *Leiberg* 1320 (C, F, M, P, RM, US); dry bluffs, Bay Horse Creek, Custer Co., 1895, *Henderson* 3743 (US); Bear Lake, 9 Aug. 1898, *Mulford* 287 (M); Weiser, Washington Co., 2200 ft. alt., 7 July 1899, *Jones* (P); St. Anthony, 15 Aug. 1900, *Merrill* 451 (US); Deer Sawtooth National Forest, 21 Aug. 1909, *Woods* & *Tidestrom* 2807 (US); hillside, Boise, 2880 ft. alt., 6 Sept. 1911, *Clark* 313 (C, F, M, P, RM, US); volcanic boulder banks, King Hills, Elmore Co., 2580 ft. alt., 17 July 1911, *Nelson* & *Macbride* 1164 (C, F, M, P, RM, US); shore, Lake Coeur d'Alene, near Silver Beach, Aug. 1912, *Rust* 181 (US); Pocatello, July 1921, *Soth* P-120 (RM); Pocatello, 1926, *Donaghe* 52 (CAS); slopes near Riggins, July 1926, *Rhodenbaugh* 12 (RM); Downey, 23 Aug. 1931, *Howell* 7940 (CAS).

UTAH: without definite locality, *Vasey* (F); Thompson Creek, 7 July 1859, *Engelmann* (M); mountains west of Camp Floyd, pass near Rush, 4 Aug. 1859, *Engelmann* (M); Glenwood, 10 June 1875, *Ward* 216 (F, M, US); Kane Co., 1875, *Siler* (M); without definite locality, 1877, *Palmer* 170 (M); City Creek Canyon, 5300 ft. alt., 25 July 1879, *Jones* 1462 (P); Milford, 17 June 1880, *Jones* (P); American Fork Canyon, 4 Aug. 1880, *Jones* (P); City Creek Canyon, Salt Lake City, 26 July 1883, *Summers* (US); Fish Spring, 4 June 1891, *Jones* (P); Provo, 6000 ft. alt., 10 July 1894, *Jones* 5609 (C, F, M, P, RM, US); Panguitch Lake, 8400 ft. alt., 6 Sept. 1894, *Jones* 6002t (P); Logan Canyon, 15 June 1897, *Williams* (CAS); Diamond Valley, 4000-5000 ft. alt., May-Oct. 1898, *Purpus* 6190 (C); Logan Canyon, 18 July 1898, *Mulford* 169 (M); American Fork Canyon, 20 June 1902, *Goodding* 1171 (M, RM, US); Salt Lake City, 16 Aug. 1902, *Cooper* 4200 (RM), Ogden Canyon, 5000-6000 ft. alt., 17 July 1902, *Pammel* & *Blackwood* 3749 (M); Salt Lake City, 16 Aug. 1902, *Cooper* 4200 (366) (RM); along Sevier River, below Marysville, 20 July 1905, *Rydberg* & *Carlton* 6960 (RM, US); Beck's Hot Springs, Salt Lake Co., 4500 ft. alt., 19 July 1905, *Garrett* 1495 (RM); Fort Douglas, 4 Oct. 1909, *Clemens* (CAS, RM); Hot Springs, 17 Aug. 1909, *Clemens* (RM); Logan Boulevard, Cache Co., 2 Aug. 1909, *Smith* 1961 (RM); Salt Lake City, 27 June 1916, *Eastwood* 7719 (CAS); Sevier Station, Sevier Co., 1680 m. alt., 21 Sept. 1918, *Eggleston* 14936 (US); north of Salt Lake City, 13 Sept. 1924, *Garrett* 3232 (RM).

NEVADA: ravine near Virginia City, Sept. 1863, *Bloomer* (US); near Virginia City, 1863-64, *Bloomer* (US); Ruby Valley, 6000 ft. alt., Aug. 1868, *Watson* 432 (US); without definite locality, 1872, *Wheeler* (US); near Virginia City, 1874, *Moore* (M); Muncy, 6 July 1891, *Jones* (P); Spencemont, 20 July 1891, *Jones* (P); Quinn River Crossing, July 1901, *Griffiths* & *Morris* 390 (US); ridge above Cave Creek post-office, Elko Co., 6250 ft. alt., 20 Aug. 1908, *Heller* 9520 (ANSP, M, US); west side of Walker Lake, Mineral Co., 16 Aug. 1927, *Haley* (CAS); ridge, north side Lee Canyon, Charleston Mts., Clark Co., 8700 ft. alt., 2 Aug. 1913, *Heller* 11053 (ANSP, F, M, US); vicinity of Austin, 1950 m. alt., 26 July 1913, *Hitchcock* 721 (US); vicinity of Austin, 1950 m. alt., 25 July 1913, *Hitchcock* 651

(US); Hunters Canyon, vicinity of Reno, 1350-1500 m. alt., 18 July 1913, *Hitchcock* 572 (US); Charleston Mts., Clark Co., 7000 ft. alt., 12 Sept. 1925, *Jaeger* (P); Charleston Mts., 3 July 1927, *Jones* (P); five miles west of Reno, 26 Aug. 1931, *Howell* 8005 (CAS, M).

OREGON: indefinite locality, *Hopkins* (US); indefinite locality, 1871, *Hall* 199 (F, M); Camp Harvey, 1875, *Bartholf* (M); gravel bars, eastern Oregon, Aug. 1880, *Howell* (F); The Dalles, Oct. 1881, *Howell* (US); Lost Valley, Gilliam Co., 940 m. alt., 9 Sept. 1894, *Leiberg* 886 (C, US); near Pendleton, 1000 m. alt., 3 Sept. 1896, *Leiberg* 2633 (US); Tygh Valley, Wasco Co., 31 Aug. 1897, *Coville & Applegate* 738 (US); Ione, Morrow Co., 14 July 1903, *Lunell* (RM); Mitchell, Wheeler Co., 2975 m. alt., 1 Aug. 1917, *Lawrence* 1028 (US); along Deschutes River, Crook Co., 17 Aug. 1919, *Whited* 121 (M); along Deschutes River, 5 miles below Bend, 1 Aug. 1920, *Peck* 9743 (ANSP, M); Illahe, 2000 ft. alt., 20 Aug. 1920, *Steward* 304 (UM); highway, 5 miles south of the Dalles, Wasco Co., 28-30 July 1922, *Abrams* 9502 (P); Rogue River bar at ferry, Curry Co., 24 Aug. 1924, *Peck* 13682 (ANSP); Alvard, Harney Co., 22 July 1927, *Henderson* 8844 (CAS); south of Kerby, Josephine Co., 15 Aug. 1928, *Gale* 373 (ANSP, M).

WASHINGTON: Topmist Creek, 1882, *Brandeggee* 532 (C, M); without definite locality, 1889, *Vasey* 232 (US); near the Columbia River, Klickitat Co., *Suksdorf* 1679 (C, F, M, US); Coulee City, 31 Aug. 1892, *Lake & Hull* (M); near Egbert Springs, Douglas Co., 1300 ft. alt., 4 July 1893 *Sandberg & Leiberg* 378 (ANSP, C, CAS, F, M, US); Spokane, Aug. 1893, *Piper* (M, RM); Spokane, 3 Sept. 1896, *Piper* (C); Waitsburg, 22 July 1897, *Horner* 213 (US); grassy slopes, Mitchell Creek, 28 Aug. 1897, *Gorman* 665 (US); without definite locality, 1897, *Sheldon* 8182 (US); Leavenworth, Okanogan Co., July 1898, *Savage, Cameron & Lenocker* (F, M); Parker Bottom, 8 July 1901, *Cotton* 433 (US); Parker, Yakima Co., 8 July 1901, *Cotton* 433 (ANSP); near Prosser, Yakima Co., 9 Aug. 1902, *Cotton* 808 (M, RM, US); Spokane, 9 Sept. 1902, *Kreager* 529 (US); Yakima Ridge, Yakima Co., 18 July 1903, *Cotton* 1408 (US); near Rockland, Klickitat Co., 3 Aug. 1904, *Suksdorf* 4075 (F, M, US); Spokane, Spokane Co., 14 Sept. 1912, *Turesson* (RM); bank of Wenatchee River along railroad west of Leavenworth, 25 Aug. 1918, *Otis* 845 (CAS); Tumwater Canyon, Chelan Co., 1300 ft. alt., 19 July 1921, *Otis* 1081 (US); Naches River, 19 Aug. 1923, *Nelson* 1554 (RM); Wilson Creek, Grant Co., 7 July 1923, *Spiegelberg* 4 (RM).

CALIFORNIA: Fort Reading, *Newberry* (US); Indian Valley, Aug., *Lemmon* (C); Indian Mt., Plumas Co., *Lemmon* 257 (F); Indian Valley, *Patterson* (F); Coyote Creek, Santa Clara Co., *Smith* 3246 (RM); Antelope Hill, *Austin* 1432 (US); without definite locality, *Bridges* 116 (US); without definite locality, 1851, *Wislizenus* (M); Fort Miller, July 1853, *Heermann* (ANSP, US); without definite locality, 1860-62, *Brewer* 2056 (US); near Camp 42, Idria, San Benito Co., 20 July 1861, *Brewer* 769 (US); Puta Canyon, Yolo Co., 5 Aug. 1862, *Brewer* 1315 (US); dry creek beds, Lake Co., 20 Sept. 1863, *Bolander* 2677 (C, US); Santa Barbara Co., 1865, *Torrey* 140 (US); Mono Lake, 1866, *Bolander* 6256 (C, F, M, US); near Healdsburg, Sonoma Co., 27 Aug. 1872, *Redfield* 121 (M); Big Trees of Calaveras, Aug.-Sept. 1872, *Torrey* (US); Sierra Co., 1874, *Lemmon* (M); Walkers Basin, 3440 ft. alt., 27 Aug. 1875, *Rothrock* 281 (F, US); Mendocino Co., 1875, *Vasey* (F); near Yreka, Siskiyou Co., 16 Aug. 1876, *Greene* 979 (M); Soda Springs, Plumas Co., July 1875, *Austin* (US); near Yreka, Siskiyou Co., 16 Aug. 1876,

Greene 979 (F); Yreka plains, 20 Aug. 1880, *Engelmann* (M); San Bernardino Mts., June 1880, *Parish* (M); Cucumonga Mt., San Bernardino Co., July 1882 *Parish & Parish 159* (ANSP, F, US); gravelly washes of Russian River, Ukiah, 14 Aug. 1882, *Pringle* (ANSP, US); Truckee, Sept. 1887, *Sonne 426* (ANSP); Hyampom, Humboldt Co., 25 July 1888, *Chestnut & Drew* (C); canyon on San Jacinto Mt., Riverside Co., 28 July 1890, *Gray 2108* (M); canyon on San Jacinto Mt., 28 July 1890, *Orcutt 2108* (M); Knight's Ferry, Stanislaus Co., 1890, *Sanford 173* (C); near Independence, Inyo Co., 14 June 1891, *Coville & Funston 956* (US); Putah Canyon near Devils Gate, July 1892, *Jepson* (C); near Pomona, 19 Nov. 1892, *Orcutt 2285* (M); bed of Clear Creek, Horsetown, 14 Sept. 1895, *Ward 69* (US); Soda Springs, Plumas Co., Aug. 1896, *Austin 855* (M, US); divide at head of Fandango Valley, 1750 m. alt., 31 July 1896, *Coville & Leiberg 137* (US); San Antonio Mts., 5800 ft. alt., 8 Aug. 1896, *Hall* (C); southwestern Colorado Desert, San Diego Co., July 1896, *Orcutt 2118* (US); San Jacinto Valley, June 1897, *Reinhardt* (C); Round Valley, Mendocino Co., 440 m. alt., 20 July–3 Aug. 1897, *Chestnut 594* (US); Pitt River Canyon, Sonoma Co., 12 July 1898, *Baker 548* (RM, US); near Sites, Glenn Co., May 1898, *Burt-Davy 4278* (C); Santa Lucia Mts., Monterey Co., June 1898, *Plaskett 165* (US); Mendocino Co., Aug. 1898, *Brown 925* (ANSP, F, M, RM, US); Monrovia, Los Angeles Co., 9 Aug. 1900, *Abrams 872* (P); Tehipite Valley, Fresno Co., 4000 ft. alt., 6–10 July 1900, *Hall & Chandler 502* (C); Hupa Valley, July 1901, *Goddard 24* (C); Lytle Creek Canyon, San Bernardino Co., 2500 ft. alt., 13 July 1902, *Abrams 2686* (ANSP, C, M, P, US); near Pomona, Nov. 1902, *Babcock* (C); Redding, Sept. 1902, *Grant 5276* (C); Warner Mts., 30 July–6 Aug. 1902, *Griffiths & Hunter 388* (US); Eel River, 1 mile below Hullville, Lake Co., 1 Aug. 1902, *Heller 6008* (ANSP, F, M, P, RM, US); Welch's Canyon, Eureka Co., 15 Aug. 1902, *Kennedy 679* (RM); Claremont, Los Angeles Co., 1 Aug. 1902, *Palmer 3* (C); San Antonio Canyon, near Claremont, Los Angeles Co., 2 Aug. 1903, *Baker 3452* (C, CAS, F, M, P, RM, US); St. Helena, Sept. 1903, *Dunnock* (C); vicinity of Ione, 200–500 ft. alt., July 1904, *Braunton 1123* (ANSP, C, M, US); Nine Mile Creek, Fresno Co., 29 July 1904, *Culbertson 4681* (C, M, P, US); Forest Home, San Bernardino Co., 5500 ft. alt., Aug. 1904, *Smith* (US); dry beds of streams, San Bernardino Co., 6000 ft. alt., Aug. 1904, *Williamson* (ANSP); Mentone, San Bernardino Co., Aug. 1904, *Smith 2* (C); Princeton, Colusa Co., 17 Oct. 1905, *Chandler* (C); flood plain, Gurneyville, 30 Aug. 1907, *Cowles 1418* (F); Valley of Van Duzen River, opposite Buck Mt., Humboldt Co., 2500 ft. alt., 27 June–30 July 1908, *Tracy 2933* (C); Mill Creek, San Bernardino Mts., 6000 ft. alt., 25 July 1909, *Hall* (US); Downieville, 1909, *Kennedy 47* (CAS); near Yreka, Siskiyou Co., 17 July 1910, *Butler 1789* (M, P, RM, US); Pitt to Baird, Shasta Co., 25 July 1912, *Eastwood 1414* (ANSP, CAS); Sisson, Siskiyou Co., 20 July 1912, *Eastwood* (CAS); Pitt River, Shasta Co., 8 July 1913, *Smith 452* (ANSP, CAS); hills, 8 miles north of Oroville, 13 Aug. 1914, *Heller 11682* (CAS, F, M); Goodwin Ranch, Buckeye Creek, Yolo Co., 25 June 1916, *Stinchfield 337* (P); Klamath River above mouth of Shasta River, Siskiyou Co., 7 Sept. 1917, *Heller 12974* (ANSP, CAS, F, M, US); near Livermore, 1 July 1918, *Herrin* (CAS); Yreka, Siskiyou Co., Sept. 1919, *Overmann* (ANSP); lower slopes, San Jacinto Mt., 1800 ft. alt., 9 July 1919, *Spencer 1266* (CAS, P); near mouth of Mormon Creek, 8000 ft. alt., 28 July 1919, *Williamson 325* (P, RM); Klamath River at Terwah, Del Norte Co., 9 Sept. 1920, *Duncan 437* (ANSP, RM); San

Jacinto, June 1921, *Campbell* (CAS); Van Duzen River, on the road, 21 July 1921, *Eastwood 10667* (CAS); Woodlake, near Exeter, 20 Sept. 1921, *Kelley* (CAS); San Jacinto, 15 July 1921, *Jaeger 1168* (P, US); near Mono Flat, Santa Barbara Co., 3 July 1923, *Grant 1686* (M); ridge south of Swartout Valley, Los Angeles Co., 8450 ft. alt., 31 Aug. 1923, *Munz 7679* (P); Rialto, 19 Aug. 1924, *Jones* (P); dry uplands, Soda Bay, Clear Lake, Lake Co., 22 July 1926, *Blankinship* (CAS); near Pope Valley Creek, southwest Walter's Springs, Napa Range, Napa Co., 24 Aug. 1927, *Howell 3048* (CAS); Sisquoc River near Santa Maria, Sept. 1927, *Sinsheimer* (CAS); Jackrabbit Pass, 6 miles west of Beaumont, 8 June 1928, *Johnson* (CAS); Coyote Creek near Edenvale, Santa Clara Co., 5 Aug. 1928, *Smith 3246* (M); Chico, Sept. 1928, *Walther* (CAS); Kelseyville, Kelsey Creek, Lake Co., 9 Aug. 1929, *Blankinship* (M); Black Canyon, White Mts., 7000 ft. alt., 6 Aug. 1930, *Duran 549* (CAS, M); Markleville, Alpine Co., 5300 ft. alt., 7 July 1930, *Rose* (CAS, M); 3 miles east of Jacksonville, Tuolumne Co., 12 Oct. 1931, *Jussel* (CAS, M); Willow Creek, Humboldt Co., 30 June 1931, *Van Dyke* (CAS).

23. *M. Brandegei* Watson in Proc. Am. Acad. **20**: 367. 1885; Howell, Fl. N. W. Am. **1**: 239. 1897; Urban & Gilg in Nov. Act. Nat. Cur. [Abh. K. Leop.-Carol. Deutsch. Akad. Naturf.] **76**: 86. 1900.

Touterea Brandegei (Wats.) Rydb. in Bull. Torr. Bot. Club **30**: 276. 1903.

Nuttallia Brandegei (Wats.) Greene, Leaflets Bot. Obs. & Crit. **1**: 210. 1906.

Perennial or biennial, from a simple root, 2–3 dm. high; stems erect, yellow or yellowish-white, terete, striate, scabrous, branched; leaves abruptly linear-lanceolate, 2–5 cm. long, deeply sinuate-pinnatifid with linear lobes, scabrous on both surfaces, subcanescent, lower leaves somewhat petiolate, upper sessile; flowers terminating branches, corymbose, 1–3-flowered, sessile, subtended by shortly pedicellate, mostly entire, narrow bracts; calyx-tube subcylindrical, about 10 mm. long, densely hispid; calyx-lobes 30–40 mm. long, densely pubescent; petals 5, pale yellow, lanceolate, 15–20 mm. long, base narrowed, apex acute or acuminate, pilose, otherwise glabrous; stamens 30–35, in 2 series, the outer 5 filaments longer and wider, alternating with the petals, other filaments linear, filiform; style filiform, apex papillose, persistent and withered in fruit; capsule narrowly oblong-cylindrical or subcylindrical, 15–20 mm. long, brownish-black, scabrous; seeds horizontal, flattened, angular, rugose, narrow, scarcely winged margins.

Distribution: sandy places in British Columbia and Washington.

Specimens examined:

BRITISH COLUMBIA: Kamloops, 28 July 1890, *Macoun* (US); Xero, Ashcroft, 28 June 1907, *Cowles* 221 (F, M); Spence's Bridge, Thompson River Canyon, 15 Aug. 1931, *Howell* 7799 (CAS).

WASHINGTON: Walla Walla River, *Wilkes Expl. Exp.* (US); 1889, *Vasey* 234 (US); sandy hills near Wenatchee, 30 July 1899, *Whited* 1172 (US); rocky slopes near Rock Island, Douglas Co., 15 June 1931, *Thompson* 6754 (M).

24. *M. polita* Nelson in Bot. Gaz. 47: 428. 1909.

Perennial from a semi-woody tap-root; stems 2 to several, slender, erect, 2–4 dm. high, cymosely branched and grayish toward the summit, glabrous and ivory-white below; leaves entire, the lower narrowly spathulate-oblongate, often abruptly acute, sessile to subsessile, intermediate and upper leaves broadest at base, all obscurely papillose and covered with short spine-like barbed hairs; calyx-tube short-turbinate, 5 mm. long; calyx-lobes subulate, divaricate, persistent; petals white, spathulate, 10 mm. long; stamens numerous, the outer filaments dilated-petaloid, antheriferous, shorter than the petals; style short, not cleft at apex; capsule globose, seeds small, obovate-rotund, smooth.

Distribution: open places, hillsides and valleys in Nevada.

Specimens examined:

NEVADA: Candelaria, Esmeralda Co., *Shockley* 227 (CAS); hillside washes, Las Vegas, 4 May 1905, *Goodding* 2273 (M, RM TYPE); Muddy Valley, Lincoln Co., 1700 ft. alt., 7 May 1906, *Kennedy & Goodding* 40 (US).

25. *M. argillosa* Darlington, n. sp.³⁵

Perennial, 2–3 dm. high; stems numerously branched, glabrous, white; leaves sessile, entire, ovate-lanceolate, somewhat spathulate above, 2–2.5 cm. long, attenuated at the base, sca-

³⁵ *M. argillosa* Darlington, sp. nov. Planta perennis, 2–3 dm. alta; caulibus multum ramosis, glabris, albis; foliis sessilibus, integris, ovato-lanceolatis, supra spathulatis, 2–2.5 cm. longis, ad basem attenuatis, scabris; floribus flavis, parvis, bracteis linearibus integris subtentis; calycis laciniis ovato-lanceolatis, 8 mm. longis, acuminatis, marginibus revolutis; petalis 6–8 mm. longis, obovatis, ad apicem acuminatis; staminibus multis, filamentis exterioribus dilatatis, interioribus linearibus; capsula turbinata, 5–8 mm. longa, scabra, brunnea; seminibus parvis, anguste alatis, brunneo-flavis, punctatis.—Vermillion, Utah, 5600 ft. alt., 16 July 1894, *Jones* 5631 (M TYPE).

brous; flowers yellow, small, subtended by linear entire bracts; calyx-lobes ovate-lanceolate, 8 mm. long, acuminate, margins revolute; petals 6–8 mm. long, obovate, apex acuminate; stamens numerous, outer filaments dilated, the inner filaments linear; capsule turbinate, 5–8 mm. long, scabrous, brownish; seeds small, narrowly winged, brownish-yellow, punctate.

Distribution: clay soil, near Vermillion, Utah.

Specimens examined:

UTAH: Vermillion, 5600 ft. alt., 16 July 1894, *Jones 5631* (M TYPE).

26. *M. perennis* Wooton in Bull. Torr. Bot. Club **25**: 260. 1898; Urban & Gilg in Nov. Act. Nat. Cur. [Abh. K. Leop.-Carol. Deutsch. Akad. Naturf.] **76**: 358. 1900.

Hesperaster perennis (Wooton) Cockerell in Torreyia **1**: 143. 1901.

Touterea perennis (Wooton) Rydb. in Bull. Torr. Bot. Club **30**: 277. 1903.

Perennial, 2–3 dm. high; stems caespitose, erect or spreading above, white, terete, scabrous with retrorsely barbed hairs to almost glabrous, bark thin, white; leaves alternate, linear, 3–10 cm. long, 2–3 mm. wide, entire or dentate with about 10 rounded lobes, scabrous with barbed hairs; flowers terminal or in upper axils, and pseudocymose, pedicellate, subtended by small leafy bracts; calyx-tube turbinate, 5 mm. long; calyx-lobes 5, subulate, about 10 mm. long, scabrous, an indurated ring forming at base of segments; petals 10, oblanceolate, acute, 2 cm. long, entire, light lemon-yellow, the 5 outer ones 5 mm. broad, the inner a little narrower; stamens numerous, 5 outer filaments slightly expanded, same length as petals, inner ones shorter; style 1 cm. long, apex minutely papillose; capsule campanulate, cylindric, barely 1 cm. long, 4 mm. in diameter, with persistent calyx-lobes, scabrous; seeds numerous, flattened, elliptic, orbicular, winged.

Distribution: on clayey soils, New Mexico.

Specimens examined:

NEW MEXICO: White Mts., Lincoln Co., 5400 ft. alt., 21 July 1897, *Wooton 184* (M, P, RM, US TYPE); along Tularosa Creek, Round Mountain, Otero Co., 1897, *Wooton 184* (US); along Tularosa Creek, Round Mountain, Otero Co., 20 Aug. 1899,

Wooton (US); along Tularosa Creek, Round Mountain, Otero Co., 20 July 1905, *Wooton* (US).

27. *M. humilis* (Gray) Darlington, n. comb.

M. multiflora (Nutt.) Gray var. *humilis* Gray in Smithson. Contr. [Pl. Wright.] **3**: 74. 1852.

M. pumila (Nutt.) Torr. & Gray var. *humilis* (Gray) Urban & Gilg in Nov. Act. Nat. Cur. [Abh. K. Leop.-Carol. Deutsch. Akad. Naturf.] **76**: 93. 1900.

Hesperaster multiflorus (Nutt.) Cockerell in Torrey **1**: 143. 1901.

Toutheria humilis (Gray) Rydb. in Bull. Torr. Bot. Club **30**: 277. 1903.

Nuttallia gypsea Wooton & Standley in Contr. U. S. Nat. Herb. [Fl. N. Mex.] **16**: 149. 1913.

Nuttallia humilis (Gray) Rydb. in Bull. Torr. Bot. Club **40**: 61. 1913.

Acrolasia humilis (Gray) Osterh. in Bull. Torr. Bot. Club **49**: 183. 1922.

Perennial, herbaceous, caespitose, 2–4 dm. high; stems leafy, smooth and white below, branched and scabrous toward the apex; leaves green, oblong to oval-oblong, 2–4 cm. long, 1 cm. wide, pinnately divided into linear obtuse segments 1 mm. broad, narrowed, short-petiolate at base, the upper and lower surface covered with scattered recurved stout white barbed glochidiate hairs with bulbiform bases; flowers small, terminal, pedicellate, subtended by 1 or 2 small linear bracts; calyx-tube campanulate, 3–4 mm. long; calyx-lobes ovate-lanceolate, acuminate, later becoming triangular-subulate, 5 mm. long; petals lanceolate, 12–15 mm. long, 2–3 mm. broad, base tapering, apex acute; stamens numerous, the outer series of filaments dilated and petaloid, the inner series shorter; capsule semi-hemispherical, 7 mm. long; seeds numerous, flat, winged, minutely tuberculate.

Distribution: clay cliffs in open places, Colorado and Utah, south to Texas and New Mexico.

Specimens examined:

TEXAS: Odessa, Sept. 1881, *Havard* (US); Camp Charlotte, 1889, *Nealley* 703 (154) (F, US).

COLORADO: clay cliffs beyond Muddy River, Middle Park, 27 July 1875, *Patterson 41* (F); clay cliffs along Muddy River, Middle Park, 28 June 1876, *Patterson* (F, M, US); McCoys, along Grand R., July 1891, *Eastwood* (CAS); Sulphur Springs, Grand Co., 7 Aug. 1907, *Osterhout 3562* (RM); Paradox, Montrose Co., 5400 ft. alt., 21 June 1912, *Walker 157* (RM, US); West Paradox, Montrose Co., 5200 ft. alt., 22 Aug. 1920, *Payson 2323* (CAS, M, RM); western Montrose Co., 5000 ft. alt., 14 July 1924, *Payson & Payson 3930* (M, RM).

UTAH: Bennett Spring, May-Oct. 1896, *Purpus* (C); White River, 6000 ft. alt., 25 May 1908, *Jones* (P).

NEW MEXICO: "western Texas to El Paso," May-Oct. 1849, *Wright 214* (ANSP, US); Gallup, 20 July 1897, *Herrick 893* (US); McCarthy Station, 25 July 1889, *Munson & Hopkins* (US); Arroyo Ranch near Roswell, 1-4 Sept. 1903, *Griffiths 5724* (US); north of Gallup, 3 Aug. 1904, *Wooton 2800* (US); plains, 35 miles south of Torrence, 6000 ft. alt., 10 Aug. 1909, *Wooton* (US); Lakewood, 6 Aug. 1909, *Wooton* (US); Arroyo Ranch near Roswell, June 1914, *Griffiths* (US).

28. *M. leucophylla* Brandegee in Bot. Gaz. 27: 448. 1889.

Biennial or perennial, 3-4 dm. high; stems several from a small tap-root, clothed with soft white pubescence; basal leaves linear-oblong, 6-8 cm. long, 1 cm. wide, attenuated at both ends, regularly sinuate-dentate, densely clothed on the upper and lower surfaces with short rigid upwardly barbed hairs, and with minute glochidiate hairs along the margin, cauline leaves oblong, 4 cm. long, 1-1.5 cm. wide, rounded at the apex, slightly acute, base cordate-clasping, slightly sinuate-dentate, densely short-hispid; flowers bright yellow, pedicellate, 1-8 mm. long, in a divaricately branched panicle; calyx-lobes triangular-acuminate, obtuse, 6 mm. long; petals broadly spathulate, apex slightly retuse and pubescent, 1 mm. long; outer series of stamens broadly petaloid, somewhat dentate above; capsule 8-10 mm. long and nearly as broad; seeds flat, narrowly margined.

Distribution: on slopes of dry arid canyons, Nevada.

Specimens examined:

NEVADA: Ash Meadows, May-Oct. 1898, *Purpus 6032* (ANSP, US TYPE); Sheep Mountain, May-Oct. 1898, *Purpus 6144* (C); between Owens and Lee Canyons, Clark Co., 5000 ft. alt., 24 July 1913, *Heller 10980*^a (ANSP, M).

29. *M. multicaulis* (Osterh.) Nelson in Coulter & Nelson, Man. Bot. Rocky Mts. 326. 1909.

M. pumila (Nutt.) Torrey & Gray var. *multicaulis* (Osterh.) Nelson in Coulter & Nelson, Man. Bot. Rocky Mts. 326. 1909.

Touterea multicaulis Osterh. in Bull. Torr. Bot. Club 30: 236. 1903.

Nuttallia multicaulis (Osterh.) Osterh. in *Muhlenbergia* 8: 45. 1912.

Perennial, 2–3 dm. high, with numerous stems, much branched; stems whitish, shining, glabrate below, hispid toward the summit; lower leaves short-petiolate, less than 1 cm. long, pinnatifid, the divisions remote and entire, upper leaves narrowly linear, entire, sessile; flowers numerous at apex of branches, opening at sundown and closing in about a half hour, short-pedicelled; calyx-tube 10 mm. long, appressed-hispid; calyx-lobes deltoid, acuminate, about 10 mm. long; petals 5, 1–2 cm. long, golden-yellow, base narrowed into a short claw; stamens numerous, outer series petaloid; capsule hispid, 1–1.5 cm. long; seeds numerous, round, smooth, slightly margined, but not winged.

Distribution: open places, Colorado and northern New Mexico.

Specimens examined:

COLORADO: Wolcott, Eagle Co., 28 July 1898, *Shear & Bessey* 5290 (US); Wolcott, Eagle Co., 21 June 1900, *Osterhout* 2113 (P, US); Wolcott, Eagle Co., 17 July 1902, *Osterhout* 2663 (CAS, P, RM).

NEW MEXICO: Rio de los Frijoles, Aug. 1910, *Robbins* 8235 (RM).

30. *M. densa* Greene in *Pittonia* 3: 99. 1896.

M. pumila (Nutt.) Torrey & Gray var. *densa* (Greene) Urban & Gilg in Nov. Act. Nat. Cur. [Abh. K. Leop.-Carol. Deutsch. Akad. Naturf.] 76: 357. 1900.

M. multiflora (Nutt.) Gray var. *densa* (Greene) Nelson in Coulter & Nelson, Man. Bot. Rocky Mts. 325. 1909.

Hesperaster densus (Greene) Cockerell in *Torreya* 1: 143. 1901.

Touterea densa (Greene) Rydb. in Bull. Torr. Bot. Club 30: 277. 1903.

Nuttallia densa (Greene) Greene in Leaflets Bot. Obs. & Crit. 1: 210. 1906.

Perennial, herbaceous, low, compactly and divaricately branched from the base, 2–3 dm. high, forming a hemispherical tuft; branches white and hispid, short-jointed and flexuous; leaves small, narrowly linear-lanceolate, sinuate-pinnatifid, hispid; flowers solitary or in clusters of 3 at the ends of the

branches, golden-yellow, 3–4 cm. broad; calyx-tube oblong, striate; calyx-lobes linear-subulate, about half the length of the tube; petals 10, subequal, spathulate-lanceolate, acute; seeds round-ovoid, thin, flat, strongly winged.

Distribution: open, sandy places in southern Colorado.

Specimens examined:

COLORADO: Grand Junction, 4500 ft. alt., 21 June 1894, *Jones 5472* (C, M, RM, US) and *5492* (M, P); Gunnison Mesa, Grand Junction, 15 May 1916, *Eastwood* (CAS); Grand Junction, 21 June 1918, *Eastwood 7222* (CAS).

31. *M. Torreyi* Gray in Proc. Am. Acad. **10**: 72. 1874; Brewer & Watson, Bot. Calif. **1**: 237. 1876; Urban & Gilg in Nov. Act. Nat. Cur. [Abh. K. Leop.-Carol. Deutsch. Akad. Naturf.] **76**: 38–39. 1900; Wooton & Standley in Contr. U. S. Nat. Herb. [Fl. N. Mex.] **16**: 433–434. 1913; Tidestrom in Contr. U. S. Nat. Herb. [Fl. Utah and Nev.] **25**: 364. 1925.

M. acerosa Jones, Contr. West. Bot. **17**: 30. 1930.

Perennial, caespitose plants, densely and tenaciously hispid, 0.5–1.5 dm. high; root thick, fleshy and straight; stems several, white, sparingly white-pubescent, with short spine-like and a few glochidiate hairs, branching freely, with short internodes, giving a tangled appearance, angled; leaves sessile, thick, 2–5 cm. long, coarsely pinnatifid, cleft at the base into 3, rarely 5, subulate-acuminate divisions, the central division terminating in a short spine, midrib very prominent, margins strongly revolute, pubescent with short stiff hairs; flowers yellow, solitary, axillary, shorter than the leaves; calyx-tube short, oblong, truncate; calyx-lobes 5, cleft below the middle, linear-subulate; petals yellow, spathulate-lanceolate to oblanceolate, 5 mm. long, densely pubescent on the outer surface; stamens about 25–35, all filaments filiform, inner series slightly shorter; style 3-parted, cleft to the middle, not twisted; capsule urceolate, ovate, contracted below the broad summit, 2–3 mm. long; seeds few, about 7–9, 1 mm. long, turgid, pyriform-oblong, pointed at the base, obscurely angled, subrugose, dark, shiny.

Distribution: sterile, saline plains of western United States.

Specimens examined:

IDAHO: Bruneau, 23 June 1930, *Jones 25020* (M TYPE of *M. acerosa* Jones).

NEVADA: U. Spring, June 1913, *K. Brandege* (C); Muncy, 4 July 1891, *Jones*

(C, CAS, P, RM, US); sterile saline plains, Humboldt Co., 1865, *Torrey 138* (US TYPE, V); Humboldt Desert, near Deephole Springs, *Lemmon* (C); Pyramid Lake, 1873, *Lemmon* (C); sandy soil, Hot Creek Valley, 3000–4000 ft. alt., May–Oct. 1898, *Purpus 6349* (US).

CALIFORNIA: without definite locality, 1875, *Lemmon 113* (US); northern part of volcanic tableland, Crooked Creek, Mono Co., 25 Aug. 1914, *Peirson 752* (PH); Sherwin Grade, Mono Co., 5500 ft. alt., 27 May 1925, *Feudge 1561* (P); on slides of fine pumice on the north shore of Mono Lake, Mono Co., 6450 ft. alt., 12 Aug. 1930, *Peirson 9200* (CAS, P, PH).

32. *M. reflexa* Coville in Proc. Biol. Soc. Wash. **8**: 74. 1892; Urban & Gilg in Nov. Act. Nat. Cur. [Abh. K. Leop.-Carol. Deutsch. Akad. Naturf.] **76**: 40. 1900; Jepson, Man. Fl. Pl. Calif. 648. 1925.

Annual herbaceous plants, 0.5–2 dm. high, densely hirsute with short stiff barbed glochidiate and spine-like hairs; stems stout, branching diffusely from the base, erect or spreading, brownish-white, longitudinally striate; leaves alternate, linear-ob lanceolate and petiolate below to ovate or slightly hastate, subsessile or sessile above, acute or obtuse at the apex, 2–6 cm. long, irregularly and deeply sinuate-dentate, nerves inconspicuous, upper surface sparsely hirsute with slender stiff spine-like hairs, lower surface densely hirsute with short stiff barbed glochidiate hairs; flowers usually solitary, small, more or less concealed by the leaves, in upper forks of the branches, small, 1–1.5 cm. long, and pedicellate; calyx-tube obovate, 7–10 mm. long, densely hirsute with long, antrorse spine-like and verticillate glochidiate hairs, pedicel 4–5 mm. long; calyx-lobes narrowly subulate, acute at the apex, 6–9 mm. long, densely hirsute with short stiff glochidiate hairs; petals 8, yellow, oblong-ob lanceolate, somewhat acute at the apex, narrowed toward the base, nearly equalling the calyx-lobes in length, barbellate near apex, otherwise glabrous; stamens 9–15, in 2 series, somewhat dilated and abruptly narrowed at apex, 3–5 mm. long, anthers emarginate at base and apex; style stout, nearly as long as the petals, cleft one-third of its length; capsule obovate-oblong, yellowish-brown, crowned by the persistent erect yellowish calyx-lobes, pedicel reflexed at the apex; seeds 10–12, angularly obovate or pyriform, compressed, slightly constricted below the middle with a deep transverse groove on either face, opaque, muriculate.

Distribution: desert ranges in Death Valley, Inyo Co., California.

Specimens examined:

CALIFORNIA: INYO COUNTY: about 8 miles above Furnace Creek Ranch, Furnace Creek Canyon, Funeral Mts., 22 March 1891, *Coville & Funston 454* (US); Surprise Canyon, Panamint Mts., 700 m. alt., 21 April 1891, *Coville & Funston 709* (US TYPE); Panamint Canyon, 2000 ft. alt., 3 May 1897, *Jones* (P); Panamint Canyon, 4000 ft. alt., 4 May 1897, *Jones* (M, P, US); Funeral Mts., Death Valley, 1000 ft. alt., 8 April 1907, *Jones* (CAS, P); Amargosa Desert, 4000 ft. alt., 27 April 1907, *Jones* (P); Salt Spring, Death Valley, 17 May 1915, *Parish 10063* (C); alluvial fan, 5 miles south of Bradbury Well, Black Mts., 1 April 1928, *Howell 3606* (CAS); Kelso, San Bernardino Co., 3000 ft. alt., 2 May 1906, *Jones* (P); near Barstow, 2300 ft. alt., 1 May 1922, *Spencer 1941* (P); open sandy expanse of the Amargosa Wash, 33 miles north of Baker, 1 April 1928, *Peirson 7765* (PH); rocky slopes, 10 miles northwest of Riggs, Mohave Desert, 3 April 1928, *Munz & Hitchcock 10955* (P); rocky hills, Baker, San Bernardino Co., 920 ft. alt., 24 March 1932, *Peirson 9824* (M, PH, UM).

33. *M. albescens* (Gill.) Griseb. in Abh. Ges. Göttingen [Pl. Lorentz.] 19: 102. 1874; Urban & Gilg in Nov. Act. Nat. Cur. [Abh. K. Leop.-Carol. Deutsch. Akad. Naturf.] 76: 91-92. 1900.

M. Wrightii Gray in Mem. Am. Acad. [Pl. Fendl.] 4: 48. 1849.

Bartonia albescens Gill. ex Arn. Edinb. Jour. Nat. & Geogr. Sci. 3: 273. 1831; Sweet, Brit. Fl. Gard. 2: 182. 1833; Hook. & Arn. in Hook. Bot. Misc. 3: 327. 1840.

Bartonia sinuata Presl, Reliq. Haenk. 2: 38. 1835; Gay, Fl. Chile 2: 428. 1846.

Bartonia Wrightii Walp. Ann. 2: 656. 1851-52.

Myriophyllum Wrightii Gray in Hall, Pl. Tex. 9, ex. Wats. Bibl. Index, 391. 1878.

Toutheria Wrightii (Gray) Rydb. in Bull. Torr. Bot. Club 30: 276. 1903.

Nuttallia Wrightii (Gray) Greene, Leaflets Bot. Obs. & Crit. 1: 210. 1906.

Nuttallia albescens (Gill. & Arn.) Standley, Jour. Wash. Acad. Sci. 6: 239. 1916.

Biennial from a fusiform root, 4-6 dm. high; stems simple, rarely paniculate, upright, white or grayish-white, striate, hirsute-scabrous; leaves alternate, oblong-lanceolate, 5-7 cm.

long, broadly sinuate-dentate to sinuate-pinnatifid, with 8–10 pairs of coarse, obtuse teeth, the lower leaves narrowed into a petiole, attenuate, the upper leaves with a truncate or subauriculate-dilated base, sessile, ovate-lanceolate or linear-lanceolate, scabrous and canescent on upper and lower surfaces; flowers cymose, terminating the ends of the branches, sessile, small, ochroleucous, subtended by 1–3 linear-subulate bracts 1–1.5 cm. long, at base of calyx-tube; calyx-tube attenuated at base, 10–20 mm. long, 3–4 mm. broad, densely hirsute-scabrous with verticillate-glochidiate hairs intermixed with a few spine-like hairs, brown or brownish-gray; calyx-lobes lanceolate to linear-lanceolate, acuminate, 2–3 mm. long, persistent, reflexed and withered on the fruit, yellowish; petals 5, lanceolate-spathulate, 7–8 mm. long, acute or shortly acuminate at the apex, slightly pilose, otherwise glabrous; stamens 30–40, in 2 series, 5 filaments of outer series petaloid, the other filaments linear-subulate, 4–6 mm. long, anthers not contorted; style about 4 mm. long, filiform, angled, densely papillose at the apex, persistent and withered in fruit; capsule subclavate-cylindrical, 2–2.5 cm. long, yellowish-brown, striate, hirsute-scabrous; seeds 50–60, in 1 or 2 series, oval-orbicular, 3–3.5 mm. long, grayish-mottled, minutely granulate-punctate, winged, membranaceous.

Distribution: dry habitats from Oklahoma southward through Mexico, Chile, and Argentina.

Specimens examined:

OKLAHOMA: vicinity of Fort Sill, 6 June 1916, *Clemens 11695* (M).

TEXAS: indefinite locality, *Wright* (ANSP); river bank, Austin, 16 May 1872, *Hall 227* (F, M, US); Austin, 1872, *Hall* (F, US); Austin, July 1882, *Letterman* (M, US); Limpia Canyon, 1889, *Nealley 156* (F); Del Rio, 13 June 1891, *Dewey* (US); Fairland-Grant Mt., 17 May 1920, *Tharp 841* (US); 15 miles northwest of Fort Davis, Jeff Davis Co., 16 June 1926, *Palmer 30976* (M).

MEXICO: Chihuahua, *Thurber* (US); Mexican Boundary Survey, Valley of Rio Grande, below Donana, *Parry, Bigelow, Wright & Schott 389* (US).

CHILE: Aconcagua, ex herb. *Philippi* (C, US); 1828–34, *Gay 357* (US); Rivadavia, Prov. Coquimbo, 800 ft. alt., Nov. 1923, *Werdemann 101* (C, F, M); Maipo, 1700 m. alt., 11 Jan. 1924, *Bro. Claude-Joseph 2929* (US).

ARGENTINA: Cordoba, Dec. 1891, *Kuntze* (F); tablelands south of Rafaela, Vallee du Rio Atuel, Prov. Mendoza, Jan.–Feb. 1897, *Wilczek 327* (US); vicinity of General Roca, Rio Negro Valley, 250–360 m. alt., Nov. 1914–Feb. 1915, *Fischer 61* (F, M,

US); Prov. Cordoba, March 1925, *Lossen* 293 (F); Rio del Vallee, Prov. Catamarca, 610 m. alt., 20 Aug. 1928, *Venturi* 6074 (M, US).

34. *M. nuda* (Pursh) Torrey & Gray, Fl. N. Am. 1: 535. 1840; Gray in Mem. Am. Acad [Pl. Fendl.] 4: 47. 1849; in Bost. Jour. Nat. Hist. [Pl. Lindh. pt. 2] 6: 191. 1850; Porter & Coulter, Fl. Colo. 47. 1874; Coulter in Contr. U. S. Nat. Herb. [Fl. Texas] 2: 119. 1891; Wooton & Standley in Contr. U. S. Nat. Herb. [Fl. N. Mex.] 16: 150. 1913.

M. nuda (Pursh) Torrey & Gray α *subpinnatifida* Ktze. Rev. Gen. 1: 251. 1891.

M. nuda (Pursh) Torrey & Gray β *integrifolia* Ktze. *Ibid.*

M. pumila (Nutt.) Torrey & Gray var. *Reverchonii* Urban & Gilg in Nov. Act. Nat. Cur. [Abh. K. Leop.-Carol. Deutsch. Akad. Naturf.] 76: 94. 1900.

Bartonia nuda Pursh, Fl. Am. Sept. 1: 328, and 2: 749. 1814; Nutt. Gen. 1: 299. 1818; DC. Prodr. 3: 340. 1828; Walp. Rep. 2: 224. 1843; Hook. Lond. Jour. Bot. 6: 227. 1847; Bot. Mag. 90: pl. 5483. 1864.

Torreya nuda Eaton, Man. Bot. ed. 7. 560. 1836; Watson, Bibl. Index, 390. 1878.

Touterea nuda Eaton & Wright ex Watson, Bibl. Index, 390. 1878.

Hesperaster nudus (Pursh) Cockerell in *Torreya* 1: 143. 1901.

Nuttallia nuda (Pursh) Greene, Leaflets Bot. Obs. & Crit. 1: 210. 1906.

Perennial from a fusiform root; stems solitary, erect, 3–5 dm. high, white, terete, striate, scabrous with verticillate, glochidiate hairs, branched above; leaves alternate, lanceolate to linear-lanceolate, 5–7 cm. long, interruptedly pinnatifid or sinuate-dentate with broad teeth, lower leaves petiolate, the intermediate leaves sessile, smaller, all leaves scabrous and subcanescent on the upper and lower surfaces; flowers corymbose, terminal, sessile, in clusters of 1–3; calyx-tube cylindrical, attenuated, 12–18 mm. long, densely hirsute-scabrous, not bracteolate; calyx-lobes lanceolate to ovate-lanceolate, long-acuminate, 15 mm. long, persistent and withered, irregu-

larly reflexed in the fruit, yellowish, prominent mid-nerve; petals 10, yellow, lanceolate to obovate-lanceolate, 2–5 cm. long, glabrous, apex acute; stamens numerous, 100–150, in 4 series, 2–4 cm. long, the 5 outer filaments petaloid and often sterile, other filaments filiform; style shorter, 1–2 cm. long, filiform, angled, densely papillose at the apex, persistent and withered in the fruit; capsule cylindrical, 2–3 cm. long, yellow to yellowish-brown, subligneous, striated; seeds 70–80, in 2 series on each placenta, orbicular-ovate, 3–4 mm. in diameter, brownish, densely granulate-punctate, broadly winged.

Distribution: gravelly and open places of Nebraska, south and westward to Oklahoma, Texas, and Colorado.

Specimens examined:

INDEFINITE LOCALITY: *Nuttall* (ANSP TYPE); Rocky Mountains, 1888, *Vasey* (US).

NEBRASKA: Upper Lawrence Fork, 10 Aug. 1891, *Rydberg 123b* (US).

KANSAS: Coolidge, Aug. 1884, *Kellerman* (US); Coolidge, 1892, *Hitchcock* (M); Hamilton Co., 3 July 1893, *Thompson 74* (US).

OKLAHOMA: Cimarron Canyon, Neutral Strip, 1 Aug. 1891, *Carleton 378* (US); near Hollis, Harmon Co., 22 June 1913, *Stevens 1161* (M).

TEXAS: near Dallas, July–Sept., *Reverchon 959b* (ANSP, F, M); Shackelford Co., *Holstein* (ANSP); Valley of Rio Grande, below Donana, *Parry, Bigelow, Wright & Schott 390* (US); indefinite locality, July 1829, *Berlandier 522–590* (ANSP); Upper Arkansas, 21 July 1845, *Fremont's Expedition 243* (M); San Antonio, July 1845, *without collector* (M); "western Texas to El Paso, New Mexico," May–Oct. 1849, *Wright 212* (C, US); Cibold River, Comal Co., July 1849, *Lindheimer 815* (ANSP, C, F, M, US); Callahan Co., May 1882, *Reverchon 322* (F, US); sandy western plains, Marion Co., June 1885, *Reverchon 322* (M); Champion Creek, Aug. 1888, *Havard* (US); Limpia Canyon, 1889, *Nealley 658 (156)* (US); Kerrville, Kerr Co., 19–26 June 1894, 1600–2000 ft. alt., *Heller 1896* (ANSP, US); San Antonio, 1897, *Wilkinson 42* (M); prairies, near Colorado, Mitchell Co., 8 June 1900, *Eggert* (M); same locality, 9–10 June 1900, *Eggert* (M); open ground, Sabinal, Uvalde Co., 7 June 1916, *Palmer 10092* (M); near San Antonio, 1900–1902, *Wilkinson* (M); near Bracken, Comal Co., 29 July 1903, *Groth 140* (F); Bexar Co., 1903 *Jermy* (M, US); Amarillo, 7 Aug. 1903, *Reverchon* (M); Estelline, 25 May 1906, *Reverchon* (M); Spanish Pass, Kendall Co., 5 July 1911, *Clemens & Clemens 540* (CAS, M, P, RM); Bexar Co., 28 June 1919, *Schulz 215* (US); below Eldorado, 2410 m. alt., 14 July 1920, *Eggleston 16706* (F); Garza Co., June 1925, *Ruth 1288* (RM, US).

COLORADO: Huerfano, Aug. 1867, *Parry 81* (M).

35. *M. strictissima* (Wooton & Standley) Darlington, n. comb.

Nuttallia strictissima Wooton & Standley in Contr. U. S. Nat. Herb. [Fl. N. Mex.] **16**: 150. 1913.

Perennial, 5–7 dm. high; stems strict, simple below, branched above, whitish, scabrous; lower leaves linear-elliptic, acute, scabrous, shallowly dentate, sessile, the upper leaves linear to linear-lanceolate, reduced and bract-like, crowded, mostly entire, attenuated; flowers few, terminal; calyx-lobes narrowly triangular, 10 mm. long, attenuate, thick, scabrous with short, stiff, white hairs; petals 18–22 mm. long, linear-oblongate, acute; stamens numerous, filaments of outer series broad and petaloid; capsules 20 mm. long, 8 mm. broad, cylindric, scabrous; seeds small, margined.

Distribution: rare occurrence in New Mexico.

Specimens examined:

NEW MEXICO: 20 miles south of Roswell, Chaves Co., 3600 ft. alt., Aug. 1900, Earle 317 (M, P, US).

36. *M. multiflora* (Nutt.) Gray in Mem. Am. Acad. [Pl. Fendl.] **4**: 48. 1849; Porter & Coulter, Fl. Colo. 47. 1874; Brewer & Watson, Bot. Calif. **1**: 235. 1876; Urban & Gilg in Nov. Act. Nat. Cur. [Abh. K. Leop.-Carol. Deutsch. Akad. Naturf.] **76**: 94. 1900; Rydb. Fl. Colo. 234. 1906; Coulter & Nelson, Man. Bot. Rocky Mts. 324. 1909; Wooton & Standley in Contr. U. S. Nat. Herb. [Fl. N. Mex.] **19**: 436. 1915; Rydb. Fl. Rocky Mts. & Adj. Plains, ed. 2. 574. 1922; Tidestrom in Contr. U. S. Nat. Herb. [Fl. Utah & Nev.] **25**: 361. 1925; Jepson, Man. Fl. Pl. Calif. 848. 1925.

M. pumila O. Ktze. Rev. Gen. **1**: 251. 1891, not *M. pumila* (Nutt.) Torrey & Gray.

M. pumila (Nutt.) Torrey & Gray var. *multiflora* (Nutt.) Urban & Gilg in Nov. Act. Nat. Cur. [Abh. K. Leop.-Carol. Deutsch. Akad. Naturf.] **76**: 93. 1900.

M. aurea Osterh. in Bull. Torr. Bot. Club **28**: 644. 1901, not Nutt.

M. speciosa Osterh. *Ibid.* 689. 1901; *Ibid.* **30**: 276. 1903.

Bartonia pumila Hook. in Lond. Jour. Bot. **6**: 227. 1847.

Bartonia multiflora Nuttall in Proc. Acad. Sci. Phila. **4**: 23. 1848.

Hesperaster multiflorus (Nutt.) Cockerell in *Torreyana* **1**: 143. 1901.

Hesperaster speciosus Osterh. in *Bull. Torr. Bot. Club* **29**: 174. 1902.

Toutheria speciosa (Osterh.) Rydb. *Ibid.* **30**: 276. 1903.

Toutheria multiflora (Nutt.) Rydb. *Ibid.* 277. 1903.

Toutheria sinuata Rydb. *Ibid.* **31**: 566. 1904.

Nuttallia multiflora (Nutt.) Greene, *Leaflets Bot. Obs. & Crit.* **1**: 210. 1906.

Nuttallia speciosa (Osterh.) Greene, *Ibid.* 1906.

Nuttallia sinuata (Rydb.) Daniels, *Fl. Boulder, Colo.* 173. 1911.

Nuttallia Springeri Standl. in *Proc. Biol. Soc. Wash.* **26**: 115. 1913.

Nuttallia marginata Osterh. in *Bull. Torr. Bot. Club* **49**: 183. 1922.

Perennial from a stout tap-root, 4–8 dm. high; stems smooth or slightly scabrous below, always pubescent towards ends of the branches, corymbosely branched, yellowish-white; leaves narrowly lanceolate, sinuate, deeply pinnatifid, 5–7.5 cm. long, 1–2 cm. broad, scabrous on upper and lower surfaces with short stiff verticillate glochidiate and antrorse spine-like hairs, sessile; flowers corymbose, terminating the branches, 3–4 in a cluster, subtended by 1, rarely 2, linear revolute bracts; calyx-tube urceolate, brownish, attenuated, 15–16 mm. long, scabrous; calyx-lobes long-subulate, yellowish, partially reflexed, persistent; petals 10, oblong-oval, obtuse at the apex, 15–20 mm. long, yellow, the inner petals smaller; stamens numerous, all antheriferous, filaments filiform, with the outer series slightly longer and somewhat broadened; style elongated, filiform; capsule urceolate, 15–20 mm. long, 6–8 mm. broad, 3- or 4-valved, scabrous with short stiff glochidiate and spine-like hairs, brownish; seeds in a double series on succulent placentae, thickish, with winged margins, pale brown.

Distribution: in sandy, open places from Wyoming to California, south to Texas and Mexico.

Specimens examined:

TEXAS: Gila Valley, Los Hetates, *Schott* (F); Gallejo Springs, south of El

Paso, 21 Aug. 1846, *Wislizenus* 134 (M); El Paso, 1851, *Wright* 1082 (ANSP); El Paso, April 1881, *Vasey* (US); Presidio, 8 May 1881, *Havard* (US); El Paso, 1884, *Jones* (P); El Paso, 23 April 1884, *Jones* 3758 (CAS, F, P, RM, US); Amarillo Creek, 29 May 1902, *Reverchon* 3103 (M); 25 miles north of Boquillas, 17 April 1919, *Hanson* 591 (M).

WYOMING: Chugwater, 30 June 1909, *Cary* 348 (US).

COLORADO: near Leadville, *Schedin & Schedin* (RM); without definite locality, 1862, *Hall & Harbour* 570 (F, M, US); Pike's Peak, 1 Sept. 1878, *Martindale* (ANSP); Ute Pass, above Manitou Springs, 1 Sept. 1881, *Engelmann* (M); Manitou, Aug. 1883, *Fritchey* (M); Larimer Co., 9 July 1884, *Sheldon* 20 (US); Pike's Peak Trail, 13 Aug. 1888, *Holway* (US); near Boulder, 5000 ft. alt., 6 July 1892, *Patterson* 210 (M); Bear Creek Cañon, 6500 ft. alt., 10 Aug. 1892, *Sheldon* 427 (US); Bear Creek Canyon, El Paso Co., 6500 ft. alt., 10 Aug. 1892, *Sheldon* 104 (US); pond border, Buena Vista, 8000 ft. alt., Chaffee Co., *Sheldon* 425 (US); Silver Cliff, July 1895, *Milligan* (US); Ute Pass, 2 July 1896, *Shear* 3692 (US); Cheyenne Canyon, 20 June 1896, *Biltmore Herbarium* 1 220 (M, US); Salida, 19 June 1898, *Baker, Earle & Tracy* 853 (C, P); Cascade Canyon, 28 July 1900, *Harper* (M); Estes Park, Larimer Co., 18 and 21 July 1900, *Osterhout* 2203 (RM, US); Pike's Peak, 1 Sept. 1901, *Nelson* 8620 (RM); Mesa, Boulder Co., 5700 ft. alt., 19 June 1906, *Daniels* 77 (M); Estes Park, 10 Aug. 1910, *Johnston* 743 (RM); Creede, Mineral Co., 1 Aug. 1911, *Murdock* 4804 (F, M, P, US); Ruxton Creek, 9500 ft. alt., 4 Aug. 1912, *Brumback & Davies* 96 (F); near hospital, Boulder, Boulder Co., 8 June 1913, *Vestal* (M); Naturita, 5400 ft. alt., 21 June 1914, *Payson* 332 (F, M, RM); Trinidad, Los Animas Co., 20 July 1918, *Osterhout* 5757 (P); Buena Vista, Chaffee Co., 2410 m. alt., 1-2 Aug. 1919, *Eggleston* 15400 (F); Divide, Cripple Creek, Teller Co., 2800 m. alt., 2 Aug. 1920, *Clokey* 3820 (ANSP, CAS, F, M, P, RM, US); Naturita, western Montrose Co., 5800 ft. alt., 20 June 1924, *Payson & Payson* 3862 (M, RM); Pike's Peak, 8800 ft. alt., 14 Aug. 1924, *Bacigalupi* 818 (P); Denver, 27 June 1926, *Benke* 4165 (F); 6 miles west of Dyke, Archuleta Co., 6450 ft. alt., 29 July 1928, *Wolf* 3085 (CAS).

NEW MEXICO: Albuquerque, *Havard* (M); near Galileo, *Bigelow* (US); Albuquerque, 17 July 1846, *Wislizenus* 18 (M); Santa Fe, June-July 1847, *Fendler* 242 (ANSP, F, M, US); Fort Defiance, 1869, *Palmer* (US); Albuquerque, 5 Sept. 1884, *Jones* (P); Whitewater, Grant Co., 31 May 1892, *Mearns* 69 (US); Albuquerque, 1894, *Herrick* (US); Lorenzo's Springs, 18 miles east of Albuquerque, 14 Sept. 1895, *Mulford* 1233 (M); hills in Santa Fe Co., 7300 ft. alt., 28 May 1897, *Heller & Heller* 3778 (M, P, US); Las Cruces, Dona Ana Co., 3900 ft. alt., 23 June 1897, *Wooton* 57 (M, P, RM, US); Gray, Lincoln Co., 6000 ft. alt., 1898, *Skehan* 115 (M, US); Patterson, 15 Aug. 1900, *Wooton* (US); dry canyon, 4600 ft. alt., Otero Co., 7 April-24 May 1902, *Rehn & Viereck* (ANSP); Mangas Springs, 19 Aug. 1902, *Wooton* (US); Florita Mts., 5400 ft. alt., 7 Sept. 1903, *Jones* (P); Mimbres River, Black Range, 5500 ft. alt., 1 July 1904, *Metcalf* 1045 (CAS, F, M, P, US); Hondo Canyon, Lincoln Co., 8200 ft. alt., 10 Aug. 1904, *Bailey* 888 (US); Turner's Ranch, 19 July 1905, *Wooton* (US); Van Patten's, Organ Mts., 9 June 1906, *Standley* (M); Mesilla Valley, Dona Ana Co., 3850 ft. alt., June 1906, *Wooton & Standley* (US); Mesilla Valley, Dona Ana Co., 3800 ft. alt., 2 Aug. 1907, *Wooton* (UM); Santa Fe, 6 Aug. 1910, *Wooton* (US); Silver City, 1911, *Beard* (M); vicinity of Raton, Colfax Co., 2100-2380 ft. alt., 21-22 June 1911, *Standley*

6254 (US); vicinity of Raton, 27 Sept. 1913, *Rose & Fitch 17555* (US); Las Huertas Canyon, Allen's Ranch, Sandia Mts., 19 July 1914, *Ellis 170* (US); mesa, 2 miles east of Albuquerque, 5000 ft. alt., 1915, *Kammerer 49* (ANSP, M, US); Lordsburg, 15 May 1919, *Eastwood 8549* (CAS); vicinity of Las Vegas, San Miguel Co., Sept. 1919, *Anect 104* (CAS, US); near Albuquerque, Bernalillo Co., 21 June 1926, *Palmer 31146* (ANSP, M); Sandia Mts., road between Santa Fe and Albuquerque, 16 Oct. 1928, *Eastwood 15641* (CAS); Carlsbad, 27 April 1929, *Benke 5036* (M); near highway, 10 miles west of Deming, 4000 ft. alt., 17 June 1930, *Goodman & Hitchcock 1149* (CAS, M).

UTAH: sandy soil, Moab, 4100 ft. alt., June 1899, *Purpus 6507* (M, US).

ARIZONA: Billie Williams Mts., 24–25 July 1864, *Anderson* (M); without definite locality, 1873, *Low* (F); near Camp Lowell, 16 May 1881, *Pringle* (F, M); Prescott, May 1883, *Rusby 612* (US); Beaver Head, 8 Aug. 1883, *Rusby 613* (F, P, US); Bowie, Sept. 1884, *Jones* (US); Big Bug, 27 July 1891, *Toumey* (US); San Bernardino Ranch, 11 Sept. 1892, *Mearns 827* (US); Niggerhead Mts., near Monument No. 82, 17 Aug. 1893, *Mearns 1945* (US); Tucson, 30 June 1894, *Toumey* (US); Prescott, 4 July 1896, *Kuntze* (US); Tucson, 6 May 1896, *Zuck* (F); Tempe, 18 Aug. 1901, *Kearney 103* (M, US); Santa Rita Mts., 20 Sept.–4 Oct. 1902, *Griffiths & Thornber 192* (US); Tempe, 18–27 May 1903, *Griffiths 4326* (US); vicinity of Yuma, 27 April 1905, *Goldman 1082* (US); ridge west of Chiricahua Mine, Chiricahua Mts., 7000 ft. alt., 10 Nov. 1906, *Blumer 1509* (F, M, US); Paradise, Chiricahua Mts., 6700 ft. alt., 30 July 1907, *Blumer 1609* (F, M, US); sand dune, Hopi Mesa, Aug. 1909, *Saunders* (US); Seligman, 10 Aug. 1911, *Wooton* (US); Parker, 6 March 1913, *Wooton* (US); limestone hill above Portal, Cochise Co., Chiricahua National Forest, 1600–1800 m. alt., 26–29 Sept. 1914, *Eggleston 10962* (US); trail to Dixie Canyon, Bisbee, 24 May 1915, *Carlson* (CAS, US); Seligman, 22 June 1916, *Eastwood 5932* (CAS); Kirkland, 1916, *Taylor 22* (US); Phoenix, 18 April 1917, *Eastwood 6162* (CAS); 4 miles south of Dos Cabezas, Chiricahua Mts., Cochise Co., 2 July 1919, *Stone 463* (ANSP); roadside near Tucson, Pima Co., 4 Jan. 1920, *Bartram 345* (ANSP); near Tucson, 12 Oct. 1925, *Peebles, Harrison & Kearney 440* (US); near Sacaton, 2 May 1926, *Harrison 1781* (US); Patagonia Mts., 28 Aug. 1927, *Peebles & Harrison 4737* (US); Soda Springs, Beaver Creek, 13 miles above Camp Verdi, Yavapai Co., 3600 ft. alt., 30 June 1928, *Wolf 2415* (CAS); Pinal Mts., 13 Oct. 1929, *Harrison & Kearney 6364* (US).

CALIFORNIA: McCoy Wash, 300 ft. alt., Colorado Desert, Riverside Co., April 1905, *Hall 5925* (RM); Kelso, San Bernardino Co., 8 June 1915, *Brandegge* (C); Ford's Well, west of Blythe, 1000 ft. alt., 3 April 1920, *Munz & Harwood 3580* (M, P, RM); 6 miles north of Blythe, Riverside Co., 400 ft. alt., 22 March 1932, *Peirson 9809* (M, PH, UM).

MEXICO: Saltillo, 2 June 1848, *Gregg 102* (M); San Lorenzo de Laguna, 75 miles southwest of Parras, State of Coahuila, 1–10 May 1880, *Palmer 358* (ANSP); St. Eulalia plains, Chihuahua, 7 Sept. 1885, *Wilkinson* (US); valley near Chihuahua, 30 Aug. 1886, *Pringle 737* (ANSP, F, M, US); Hermosillo, Sonora, 10 June 1897, *Maltby 224* (US); Torreon, Coahuila, 13–20 Oct. 1898, *Palmer 480* (M); near Casas Grandes, State of Chihuahua, 30 Aug. 1899, *Nelson 6323* (US); Casas Grandes, Chihuahua, 2 June 1899, *Goldman 431* (US); plains at Montezuma Station, Chihuahua, 5000 ft. alt., 27 Sept. 1902, *Pringle 9803* (F, M, US); Colonia

Juarez, Sierre Madre Mts., Chihuahua, 5200 ft. alt., 11 Sept. 1903, *Jones* (P); vicinity of Aldamia, Chihuahua, 15-17 May 1908, *Palmer 248* (F, M, US); vicinity of Magdalena, Sonora, 25 April 1910, *Rose, Standley & Russell 15085* (US); Arroyo de Las Alamos, El Alamo near Magdalena, Sonora, 17 May 1925, *Kennedy 7092* (CAS, M, US); El Alamo Ranch, Magdalena, 25 May 1925, *Kennedy* (CAS).

37. *M. pumila* (Nutt.) Torrey & Gray, Fl. N. Am. 1: 535. 1840; Urban & Gilg in Nov. Act. Nat. Cur. [Abh. K. Leop.-Carol. Deutsch. Akad. Naturf.] 76: 93. 1900; Rydb. Fl. Colo. 234. 1906; Coulter & Nelson, Man. Bot. Rocky Mts. 324. 1909; Wootton & Standley in Contr. U. S. Nat. Herb. [Fl. New Mex.] 19: 436. 1915; Rydb. Fl. Rocky Mts. & Adj. Plains, ed. 2. 574. 1922; Davidson & Moxley, Fl. South. Calif. 239. 1923; Tidestrom in Contr. U. S. Nat. Herb. [Fl. Utah & Nev.] 25: 361. 1925.

M. Wrightii Porter & Coulter, Fl. Colo. 47. 1874.

M. multiflora (Nutt.) Gray var. Parry in Am. Nat. 9: 271. 1895.

M. pumila (Nutt.) Torr. & Gray, var. *genuina* Urb. & Gilg in Nov. Act. Nat. Cur. [Abh. K. Leop.-Carol. Deutsch. Akad. Naturf.] 76: 93. 1900.

Bartonia pumila Nutt. Gen. N. Am. 1: 299. 1818.

Hesperaster pumilus (Torr. & Gray) Cockerell in Torreya 1: 143. 1901.

Touterea pumila (Nutt.) Rydb. in Bull. Torr. Bot. Club 30: 277. 1903.

Nuttallia pumila (Nutt.) Greene, Leaflets Bot. Obs. & Crit. 1: 210. 1906.

Biennial from a fusiform root; stems tortuous, grayish or yellowish-white, striate, low and stout, most branched toward the summit, pubescent with glochidiate and spine-like hairs; leaves alternate, obovate-lanceolate to linear-lanceolate, 3-10 cm. long, irregularly sinuate-dentate to sinuate-pinnatifid, acute or obtuse at the apex, upper and lower surfaces scabrous with short verticillate glochidiate hairs, lower leaves somewhat petioled, the intermediate leaves sessile with subcordate semi-amplexicaul base; flowers cymose, terminating branches, in clusters of 1-3, small, slightly pedicellate, subtended at base of calyx-tube by 1-2 linear setaceous bracts; calyx-tube subcylindrical or clavate, 5-15 mm. long, attenuated, hirsute, sca-

brous; calyx-lobes ovate-oblong, long-acuminate, lanceolate to linear-lanceolate, yellowish, persistent and withered in fruit, reflexed; petals 10, yellow, obovate to lanceolate, unguiculate, acute or obtuse at the apex, 9–15 mm. long, apex sparsely pilose, otherwise glabrous; filaments 60–120, in 3 to 4 series, outer series broadened and longer, the other series linear; style filiform, angled, persistent in fruit, apex papillose; capsule subcylindrical, oblong or clavate, attenuate, obtuse or rotund at the base, 15–20 mm. long, brownish-yellow to brownish-black, scabrous, striate; seeds in 2, rarely 1, rows, mottled brown, minutely punctate-granulate, broadly winged.

Distribution: prairies and slopes, Wyoming and Utah, south to Texas and Arizona.

Specimens examined:

INDEFINITE LOCALITY: Ham's Fork of the Colorado of the West, *Nuttall* (ANSP TYPE).

TEXAS: flats north of Van Horn, El Paso Co., 9 July 1900, *Eggert* (M); prairies north of Sierra Blanca, El Paso Co., 12 July 1900, *Eggert* (M); flats north of Van Horn, El Paso Co., 13 May 1901, *Eggert* (M).

COLORADO: Montrose, 21 July 1897, *Shear* 4810 (US).

NEW MEXICO: indefinite locality, 1851, *Wright* 1082 (US); arroyo south of San Marcial, Socorro Co., 22 June 1921, *Ferris & Duncan* 2338 (CAS, M).

UTAH: indefinite locality, *Ward* (ANSP); near Glenwood, 5000 ft. alt., 4 June 1875, *Ward* 164 (ANSP, M, US); Green River, 21 June 1879, *Jones* (P); sands near Green River, 4500 ft. alt., 12 June 1901, *Stokes* (US).

ARIZONA: indefinite locality, *Voth* 17 (F); 12 miles below Black Falls, Little Colorado, 15 May 1901, *Ward* (US); Yuma, 25 April 1906, *Jones* (P); top of Sunset Mountain, Coconino National Forest and vicinity, 8000 ft. alt., 25 Aug. 1908, *Pearson* 39 (US); Flagstaff, 7000 ft. alt., 31 Aug. 1923, *Hanson & Hanson* 932 (M); slope of Sunset Mountain, 4 July 1923, *Hanson & Hanson* 616 (M, RM).

WYOMING: dry places, North Fork Wind River, 16 July 1882, *Forwood* (US); Big Wind River, 5 Aug. 1894, *Nelson* 3989 (RM).

37a. *M. pumila* (Nutt.) Torrey & Gray var. *procera* (Wooton & Standley) Darlington, n. comb.

Nuttallia procera Wooton & Standley in Contr. U. S. Nat. Herb. [Fl. New Mex.] 16: 150. 1913.

Perennial, slender, 6–10 dm. high; stems strict, sometimes branching at the base, white, the epidermis papery, smooth except on young stems; leaves small, sessile, oblong, obtuse, 3–5 cm. long, about 0.5 cm. broad, with 5–10 coarse rounded teeth on each side, scabrous with short stout white barbed hairs; flowers small on slender terminal peduncles; calyx-lobes nar-

rowly lanceolate, abruptly acuminate; petals bright yellow, oblanceolate, acute, 1 cm. long; outer series of filaments petaloid, narrower than the petals, short-acuminate; capsule oblong-cylindric, 10–12 mm. long, 6–7 mm. in diameter; seeds numerous, disk-shaped, white, tuberculate, surrounded by a broad white wing.

Distribution: Utah and Nevada, south to western Texas and northern Mexico.

Specimens examined:

TEXAS: Frenon, April 1852, *Parry* (M); Cibola Creek, July 1852, *Parry* (M); El Paso, 25 June 1891, *Evans* (M); Altura Park, Franklin Mts., 10 July 1911, *Barlow* (F); Canutillo, Franklin Mts., 21 July 1911, *Barlow* (F); El Paso, 4 Aug. 1920, *Schulz* 227 (US); 4 miles west of Sierra Blanca, Hudspeth Co., 4 July 1921, *Ferris & Duncan* 2482 (CAS); Indian Hot Springs, 30 April 1930, *Jones* 25662 (M); mesa, north of Chisos Mts., Brewster Co., 1370 m. alt., 27 June 1931, *Moore & Steyermark* 3275 (M).

NEW MEXICO: Bloomfield, San Juan Co., *Waring* 26 (ANSP); White Sands, Dona Ana Co., 3600 ft. alt., 21 June 1895, *Wooton* (US); White Mts., Lincoln Co., 24 Aug. 1897, *Wooton* 567 (M, US); White Sands, Dona Ana Co., 4000 ft. alt., 17 July 1897, *Wooton* 571 (US); Albuquerque, 1900, *Harward* 20 (M, US); White Sands, Otero Co., 20 July 1901, *Wooton* (US); Lake Valley, 28 Aug. 1903, *Diehl* 685 (P); Lake Valley, 28 Aug. 1903, *Diehl* 680 (P); White Sands, Otero Co., 31 Aug. 1904, *Wooton* (US); Mesilla Valley, Dona Ana Co., 3800 ft. alt., 2 Aug. 1907, *Wooton* (US); Navajo Indian Reservation, vicinity of Shiprock Agency, 1425 m. alt., 25 July 1911, *Standley* 7272 (US); mesa, at Huecos, 25 Aug. 1911, *Barlow* (F); plains southeast of Carlsbad, 12–20 Aug. 1924, *Standley* 40331 (US); 27 miles south of Animas, Animas Valley, Hidalgo Co., 4640 ft. alt., July 1928, *Wolf* 2588 (CAS).

UTAH: Sierra La Sal, May–Oct. 1900, *Purpus* 8091 (C, M, US).

NEVADA: washes, Pioche, 3000–4000 ft. alt., May–Oct. 1898, *Purpus* 6269 (US); Pioche, Aug. 31, 1912, *Jones* (P).

ARIZONA: Little Colorado, 9 June 1890, *Jones* (P); St. Joe, 20 July 1892, *Wooton* (US); Piny Creek, Chiricahua Mts., Aug. 1896, *Fernow* (US); Holbrook, 28 June 1896, *Zuck* (F, M); Holbrook, 31 July 1896, *Zuck* (US); indefinite locality, Aug.–Sept. 1896, *Hough* 19 (US); Flagstaff, May–Oct. 1900, *Purpus* 8071 (C); near Walnut Canyon on slopes, 1700 m. alt., 1 Aug. 1901, *Leiberg* 5798 (US); Adamana to Navajo, 12 Sept.–18 Oct. 1903, *Griffiths* 5792 (M, US); Adamana to "Long H" Ranch, 6–15 Aug. 1903, *Griffiths* 5170 (US); Yuma, 6 Nov. 1909, *Mowry* (US); Adamana, 27 June 1913, *Hitchcock* 16½ (US); Adamana, 27 June 1913, *Hitchcock* 9 (US); Yuma, 21 April 1913, *Wooton* (US); 3 miles north of Fort Whipple, 5000 ft. alt., 9 July 1916, *Taylor* 44 (US); Yuma, 22 April 1917, *Eastwood* 6327 (CAS); Yuma, 22 April 1917, *Eastwood* 6344 (CAS); Winona, 6400 ft. alt., 16 July 1917, *Goldman* 2857 (US); Yuma, 10 April 1922, *McQuarrie* (CAS); near Cameron, 5000 ft. alt., 29 July 1922, *Hanson* A149 (M, P); between Jacob's Pool and Horserock, 13 July 1926, *Jaeger* (P); near Yuma, 10 Oct. 1927, *Peebles, Harrison & Kearney* 4955 (US).

MEXICO: San Lorenzo, States of Coahuila and Nuevo Leon, Feb.-Oct. 1880, *Palmer 359* (F, US); near Saltillo, State of Coahuila, 5300 ft. alt., 15-30 April 1898, *Palmer 45* (C, F, M, US); Cerro de Cypriano, Coahuila, June 1910, *Purpus 4535* (F, M, US).

38. *M. chrysantha* Engelm. ex Brandegee in Bull. U. S. Geol. Surv. Terr. [Fl. Southwest. Colo.] **2**: 237. 1876; Rydb. Fl. Colo. 235. 1906. Coulter & Nelson, Man. Bot. Rocky Mts. 325. 1909; Rydb. Fl. Rocky Mts. & Adj. Plains, ed. 2. 572. 1922.

Hesperaster chrysanthus (Engelm.) Cockerell in Torrey **1**: 143. 1901.

Toutheria chrysantha (Engelm.) Rydb. in Bull. Torr. Bot. Club **30**: 277. 1903.

Nuttallia chrysantha Greene, Leaflets Bot. Obs. & Crit. **1**: 210. 1906.

Biennial; stems 3-6 dm. high, branched, decumbent toward base, mostly smooth; leaves ovate-lanceolate, 2-7 cm. long, sinuate-dentate, lower leaves narrowed toward the base, upper ones sessile, often entire; flowers subsessile, subtended by bracts; petals 10, 15-20 mm. long, the inner 5 petals smaller and often antheriferous; capsule 2.5-3 cm. long; seeds narrowly margined but not winged, surface rough.

Distribution: southern Wyoming and Colorado, probably also in Utah.

Specimens examined:

WYOMING: Laramie, 10 Aug. 1895, *Nelson 1662* (C, RM); Laramie, 19 July 1900, *Nelson 7634* (M, P, RM, US); near Jelm, 12 Aug. 1900, *Nelson 8066* (RM); near Pine Bluffs, 12 Aug. 1917, *Nelson 9798* (M).

COLORADO: Canyon City, 15 Sept. 1873, *Brandegee 842* (M); Fremont Co., 1874, *Brandegee* (M); limestone hills at Canyon City, 26 Sept. 1874, *Engelmann* (M); Canyon City, Oct. 1875, *Brandegee* (M); Ute Pass, Manitou Springs, 3 Sept. 1881, *Engelmann* (M); Pike's Peak, 1890, *Carleton* (F); Manitou, 16 Aug. 1901, *Clements 37* (M, RM, US); north of Florence, Fremont Co., 1 Sept. 1921, *Clokey 4214* (ANSP, CAS, F, M, P, RM, US).

39. *M. Rusbyi* Wooton in Bull. Torr. Bot. Club **25**: 261. 1898; Wooton & Standley in Contr. U. S. Nat. Herb. [Fl. N. Mex.] **19**: 434. 1915.

M. pumila (Nutt.) Torrey & Gray var. *Rusbyi* Urban & Gilg in Nov. Act. Nat. Cur. [Abh. K. Leop.-Carol. Deutsch. Akad. Naturf.] **76**: 358. 1900.

Hesperaster Rusbyi (Wooton) Cockerell in *Torreya* 1: 143. 1901.

Touthera Rusbyi (Wooton) Rydb. in Bull. Torr. Bot. Club 30: 276. 1903.

Nuttallia Rusbyi (Wooton) Rydb. *Ibid.* 40: 61. 1913.

Nuttallia hastata Osterh. *Ibid.* 46: 53. 1919.

Biennial, 8–15 dm. high, branched above; stems erect, stout, scabrous, later becoming glabrous, yellowish-white; lower leaves long, linear-lanceolate, 10–20 cm. long, 1.5–2 cm. broad, attenuated into a petiole, the upper leaves oblong-lanceolate, 4–10 cm. long, sessile, acuminate, sinuate-dentate with a few large sharp teeth, the upper and lower surfaces of leaves rough with barbed hairs; flowers in terminal crowded cymes; calyx-tube clavate, 8–10 mm. long, subtended by two pinnatifid bracts at its base; calyx-lobes narrowly lanceolate, acuminate, 10–12 mm. long; petals 10, light yellow, the outer five narrowly obovate to oblanceolate, acute, 16–20 mm. long, the inner five petals narrower and shorter, often bearing rudimentary anthers at the apex; stamens numerous, 6–12 mm. long, few of the outer filaments slightly dilated; style 1 cm. long, 3-cleft at apex; capsule clavate-cylindric, 3 cm. long, 1 cm. in diameter, striated, scabrous, dark brown; seeds numerous, flattened, ovate, winged.

Distribution: moist slopes of Wyoming southward to New Mexico and Arizona.

Specimens examined:

WYOMING: Cummins, 28–29 July 1895, *Nelson 1470* (M, P, RM, US).

COLORADO: Salida, 14 June 1870, *Bodin* (RM); indefinite locality, Sept. 1875, *Brandegee 1243* (C, M); Middle Park, 27 July 1875, *Patterson* (F); Le Late, Aug. 1875, *Brandegee 1282* (M); Hot Springs Canyon, 12 Sept. 1881, *Engelmann* (M); Dixon Canyon, 31 May 1890, *Crandall 138* (US); Wagon Wheel Gap, Aug. 1890, *Smith* (ANSP); Durango, July 1890, *Eastwood* (CAS); Durango, 1 Aug. 1896, *Tweedy 590* (US); Durango, 18–25 July 1898, *Baker, Earle & Tracy 482* (C, CAS, F, M, P, RM, US); Arboles, June 1899, *Baker 471* (M, P, RM, US); North Park, 6 Sept. 1900, *Osterhout 2268* (P, US); Wolcott, Eagle Co., 21 June 1900, *Osterhout 2110* (RM, US); Jelm, Albany Co., 12 Aug. 1900, *Nelson 8069* (M, P, RM, US); Black Canyon, 8 July 1901, *Baker 370* (M, P, US); Wolcott, 11 July 1902, *Osterhout 2664* (P, RM); near Bayfield, 12 Aug. 1904, *Wooton* (US); near Floressant, 1–8 Aug. 1905, *Ramaley 1397* (RM); Wagon Wheel Gap, 30 July 1911, *Murdock 4771* (CAS, F, M, P, US); Iron Springs, Mesa, 21 Aug. 1912, *Walker 525* (RM, US); Colton, 14 Aug. 1915, *Drushel* (M); Placerville, 23 July

1917, *Payson* 1094 (M, RM); Walden, 6 Aug. 1918, *Osterhout* 5796 (P, RM); Piedra, Sept. 1924, *Schmoll* 1488 (RM); near Dyke, 29 July 1928, *Wolf* 3084 (CAS); between Trinidad and Morley, 29 July 1929, *Mathias* 489 (M).

NEW MEXICO: Near Moro River, 17 Aug. 1847, *Fendler* 243 (M); Gilmore's Ranch, White Mts., 14 July 1895, *Wooton* (US); White Mts., Lincoln Co., 6300 ft. alt., 25 July 1897, *Wooton* 210 (M, P, RM, US TYPE); Mogollon Mts., Socorro Co., 5 Aug. 1900, *Wooton* (US); Sacramento Mts., Fresnal, Otero Co., 27 Aug. 1901, *Wooton* (P, RM, US); Mogollon Mts., 9 Aug. 1903, *Metcalf* 450 (M, P, RM, US); Farmington, 8 Aug. 1904, *Wooton* (US); White Mts., Lincoln Co., 21 July 1905, *Wooton* (US); Wheeler's Ranch, 11 July 1906, *Wooton* (US); White Mts., Lincoln Co., 25 Aug. 1907, *Wooton & Standley* 3445 (US); Pecos National Forest, 19 July 1908, *Standley* 4400 (US); Mora, 11 Aug. 1910, *Wooton* (US); near Dulce, 19 Aug. 1911, *Standley* 8094 (US); Vermejo Park, Colfax Co., 31 Aug. 1913, *Wooton* (US); near Ute Park, Colfax Co., 27 Aug. 1916, *Standley* 13906 (US).

ARIZONA: Bellemont, 2 Sept. 1883, *Rusby* 614 (ANSP); Walker Lake, San Francisco Mts., 17 Sept. 1889, *Knowlton* 286 (US); Nagle's Ranch, 17-18 Sept. 1894, *Jones* 6054 (M, P, US); east of San Francisco Peaks, 1 Aug. 1901, *Leiberg* 5806 (US); Flagstaff to Mogollon Mts., 8-25 July 1903, *Griffiths* 4964 (US); Flagstaff, 4 Aug. 1922, *Hanson* 150 (F, M); Coconino Plateau, 29 July 1926, *Taylor* (CAS).

40. *M. laciniata* (Rydb.) Darlington, n. comb.

Toutheria laciniata Rydb. in Bull. Torr. Bot. Club **31**: 565. 1904.

Nuttallia laciniata (Rydb.) Wooton & Standley in Contr. U. S. Nat. Herb. **16**: 150. 1913.

Biennial or perennial, 3-4 dm. high; stems strict, white, puberulent, branched above; leaves narrowly lanceolate, 5-12 cm. long, deeply pinnatifid to near the midrib, the sinuses rounded or semi-rhombic, lobes oblong to lanceolate, obtuse; flowers terminal, subtended by 1-2 laciniate bracts; calyx-lobes 10 mm. long, lanceolate, apex subulate, soon reflexed; petals golden-yellow, oblanceolate, 15-20 mm. long, base narrowed, apex acute; outer series of stamens petaloid, the other filaments filiform and three-fourths the length of petals; capsule urceolate, 15-20 mm. long, 6-8 mm. broad, scabrous with short, glochidiate and spine-like hairs, brownish; seeds thickish, with winged margins, pale brown.

Distribution: dry hillsides of Colorado and New Mexico.

Specimens examined:

COLORADO: Antonito, 19 July 1898, *Earle* 19 (M); Durango, 18 July 1898, *Baker, Earle & Tracy* 496 (F, M, P, US); Pagosa Springs, 7000 ft. alt., July 1899, *Baker* 470 (F, M, P, RM, US); San Acacio, Costilla Co., 7737 ft. alt., 15 July 1912, *War-*

ren 36 (RM); Divide, Cripple Creek, Teller Co., 2800 ft. alt., 2 Aug. 1920, *Clokey 3820* (UM); Ridgway, Ouray Co., 7500 ft. alt., 20 Aug. 1920, *Payson & Payson 2309* (CAS, M, RM); Ridgway, Ouray Co., 17 June 1924, *Payson & Payson 3831* (M, RM).

NEW MEXICO: Gallup, 10 June 1916, *Eastwood 5633* (CAS); 8 miles south of Conjilon, Rio Arriba Co., 6630 ft. alt., 24 July 1928, *Wolf 2908* (CAS).

41. *M. pterosperma* Eastw. in Proc. Cal. Acad. Sci. II. 6: 290. 1896; Urban & Gilg in Nov. Act. Nat. Cur. [Abh. K. Leop.-Carol. Deutsch. Akad. Naturf.] 76: 356-357. 1900.

Toutheria pterosperma (Eastw.) Rydb. in Bull. Torr. Bot. Club 30: 276. 1903.

Nuttallia pterosperma (Eastw.) Greene, Leaflets Bot. Obs. & Crit. 1: 210. 1906.

Annual, from a fusiform root, 1-2 dm. high, divaricately branched; stems erect, white, shreddy, covered with barbed hairs; lower leaves petiolate, spatulate, often orbicular, 15-20 cm. long, sinuate-dentate, rarely entire, upper leaves sessile, broad at base, 3 cm. long, 2 cm. wide, not uniform in shape or size; flowers at ends of branches, pedicelled, bracted; calyx-tube campanulate, attenuate, about 6 mm. long, 4 mm. broad, densely pubescent; calyx-lobes triangular, acuminate, 6 mm. long, pubescent on outer surfaces, almost glabrous on inner surface; petals lanceolate, 15 mm. long, 4 mm. wide, obtuse; filaments 30-40, in 2 or 3 series, interior filiform, outer series petaloid, anthers minutely scabrous; style filiform, glabrous, angled; capsule campanulate-cylindrical, rotund at base, 10-15 mm. long, 7-8 mm. broad, splitting irregularly; seeds 4 mm. in diameter, in 2 series, oval-rotund, winged with broad circular wings, yellowish-white, covered with minute white dots.

Distribution: mesas in Colorado and Utah.

Specimens examined:

COLORADO: dry mesas, Hotchkiss, 30 June 1892, *Cowen* (US); Grand Junction, May 1892, *Eastwood* (CAS); Gunnison Mesa, Grand Junction, 15 May 1916, *Eastwood 5092* (CAS).

UTAH: 1872, *Bishop* (US); Moab, 26 May 1892, *Eastwood* (CAS); Willows Creek, San Juan Co., 14 July 1895, *Eastwood 31* (CAS TYPE); Green River, 26 June 1899, *Jones* (P).

42. *M. integra* (Jones) Tidestrom in Contr. U. S. Nat. Herb. [Fl. Utah and Nev.] 25: 362. 1925.

M. multiflora (Nutt.) Gray var. *integra* Jones in Proc. Cal. Acad. Sci. II. 5: 689. 1895.

Toutheria integra Rydb. Fl. Colo. 235. 1906.

Nuttallia integra (Jones) Rydb. in Bull. Torr. Bot. Club 40: 61. 1913.

Nuttallia lobata Rydb. *Ibid.*

Perennial from a thick root, 3–4 dm. high; stems strict, pubescent, later becoming almost entirely glabrous, shining white; leaves 5–8 cm. long, oblanceolate to ovate-lanceolate above, mostly entire, rarely simply toothed or triangularly lobed; flowers terminal, subtended by narrowly linear bracts; calyx-lobes lanceolate, acuminate, 8–10 mm. long; petals golden-yellow, spathulate, obtuse, 12–18 mm. long; petaloid staminodia similar and almost equal in size to the petals; filaments numerous in several series, outer series dilated; capsule 15 mm. long, 8–9 mm. broad, acute, turbinate base; seeds large, orbicular, broadly winged.

Distribution: dry hills and mesas, from southern Utah to northern Arizona and northwestern New Mexico.

Specimens examined:

UTAH: near St. George, 1874, *Parry* 76 (ANSP, F, M); St. George, 13 May 1902, *Goodding* 776 (M); Leeds, 1020 m. alt., 9 May 1919, *Tidestrom* 9386 (M, US).

ARIZONA: Virgin River, 2000–3000 ft. alt., May–Oct. 1898, *Purpus* 6192 (M, US).

43. *M. oreophila* Darlington, n. sp.³⁶

Perennial, 2–3 dm. high; stems branched, white, finely pubescent; leaves lanceolate below to ovate-lanceolate above, attenuated below, acuminate at the apex, 3–6 cm. long, coarsely dentate, scabrous, light green, canescent; flowers few, at the

³⁶ *M. oreophila* Darlington, sp. nov. Planta perennis, 2–3 dm. alta; caulibus ramosis, albis, minute pubescentibus; foliis inferioribus lanceolatis, superioribus ovato-lanceolatis, 3–6 cm. longis, ad basem attenuatis, ad apicem acuminatis, grosse dentatis, scabris, pallide viridibus, canescentibus; floribus paucis ad terminos ramorum, flavis, bracteis integris lanceolatis subtentis; calycis lobis ovatis, acuminatis, flavis, in fructu reflexis; petalis obovatis, obtusis, 10–12 mm. longis; filamentis exterioribus petaloideis, interioribus linearibus; capsula turbinata, 8–10 mm. longa, breve pedicellata, brunneo-nigra, hirsuto-scabra; seminibus late alatis, pallide brunneis, punctatis.—Argus Mts., California, 5000 ft. alt., 11 May 1897, *Jones* (M TYPE).

ends of the branches, yellow, subtended by entire lanceolate bracts; calyx-lobes ovate, acuminate, yellow, reflexed on the fruit; petals obovate, obtuse, 10–12 mm. long; outer filaments petaloid, inner filaments linear; capsule turbinate, 8–10 mm. long, shortly pedicellate, brownish-black, hirsute-scabrous; seeds broadly winged, light brown, punctate.

Distribution: mountainous regions of Inyo County, California.

Specimens examined:

CALIFORNIA: Argus Mts., 5000 ft. alt., 11 May 1897, *Jones* (M TYPE).

44. *M. longiloba* Darlington, n. sp.³⁷

Perennial from a stout root, 1–2 dm. high; stems and branches white or yellowish, scabrous at first, later becoming almost glabrous, exfoliating below; leaves few, sessile, long-attenuated below, lanceolate to ovate-lanceolate, 2–6 cm. long, upper leaves smaller, irregularly sinuate-dentate, scabrous; flowers at the ends of the branches, subtended by linear bracts; calyx-lobes ovate-lanceolate, 9–11 mm. long, persistent and reflexed on the fruit; petals yellow, 10–12 mm. long, narrowly obovate; stamens numerous, outer series of filaments dilated, the inner filaments linear; capsule oblong-rotund, 8–10 mm. long, pedicellate, hirsute-scabrous, pale yellowish or nearly white at maturity; seeds numerous, broadly winged, minutely punctate.

Distribution: Utah and California.

Specimens examined:

UTAH: Moab, 30 Aug. 1891, *Jones* (P).

CALIFORNIA: "Hayfields," 15 Sept. 1931, *Jones* (M TYPE); north Fork of Hanaupah Canyon, Panamint Mts., 6000 ft. alt., 7 May 1932, *Peirson* 00 (M, PH);

³⁷ *M. longiloba* Darlington, sp. nov. Planta perennis, radice crassa, 1–2 dm. alta; caulibus et ramis albis vel flavis, primo scabris, deinde paene glabris, ad basem exfoliantibus; foliis paucis, sessilibus, inferioribus longe attenuatis, lanceolatis vel ovato-lanceolatis, 2–6 cm. longis, superioribus parvioribus, inaequaliter sinuato-dentatis, scabris; floribus ad terminos ramorum, bracteis linearibus subtentis; calycis lobis ovato-lanceolatis, 9–11 mm. longis, in fructu persistentibus reflexisque; petalis flavis, 10–12 mm. longis, anguste obovatis; staminibus numerosis, filamentis exterioribus dilatatis, interioribus linearibus; capsula oblongo-rotundata, 8–10 mm. longa, pedicellata, hirsuto-scabra, ad maturitatem pallide flava aut paene alba; seminibus numerosis, late alatis, minute punctatis.—"Hayfields," California, 15 Sept. 1931, *Jones* (M TYPE).

2 miles east of Darwin, Inyo Co., 4500 ft. alt., 6 May 1932, *Peirson 9894* (M, PH, UM).

45. *M. puberula* Darlington, n. sp.³⁸

Perennial, 1.5 dm. high; stems and branches somewhat decumbent, white, scabrous, long ovate-lanceolate; leaves 3–5 cm. long, coarsely dentate; flowers yellow, at the ends of the branches, subtended by one linear bract; calyx-lobes persistent, revolute, lanceolate, 6–8 mm. long; petals narrowly obovate, 8–10 mm. long, apex obtuse, base unguiculate; outer stamens petaloid, inner filaments linear; capsule turbinate, 9–10 mm. long, pedicellate, scabrous; seeds light brown, broadly winged, slightly punctate.

Distribution: southern California and adjacent Arizona.

Specimens examined:

CALIFORNIA: Kane Springs, Ord Mts., San Bernardino Co., 1 May 1906, *Hall & Chandler 6824* (C TYPE, M photograph).

ARIZONA: Gila Mts., Yuma Co., 28 March 1932, *Harrison & Kearney 8410* (M, US).

46. *M. lutea* Greene in Pittonia 3: 99. 1896.

Toutheria lutea (Greene) Rydb. Fl. Colo. 235. 1906.

Nuttallia lutea Greene, Leaflets Bot. Obs. & Crit. 1: 210. 1906.

Biennial, from a slender fusiform fleshy root; stems 4–6 dm. high, branched above; basal leaves thickened, sinuate-pinnatifid, upper leaves large, sinuate-dentate; flowers small, deep greenish-yellow; petals 10, acute, elliptical, narrowed at base into a ligulate claw, the inner petals shorter than the outer, stamens numerous, style exceeding the stamens; capsule thick-walled, not striate; seeds oval, flattened, irregularly angled, with a thin winged margin.

Distribution: alkaline soil near Canyon City, Colorado.

³⁸ *M. puberula* Darlington, sp. nov. Planta perennis, 1.5 dm. alta; caulibus et ramis decumbentibus, albis, scabris, longo-ovato-lanceolatis; foliis 3–5 cm. longis, grosse dentatis; floribus flavis ad terminos ramorum, uno bracteo lineare subtentis; calycis lobis persistentibus, revolutis, lanceolatis, 6–8 mm. longis; petalis anguste obovatis, 8–10 mm. longis, apice obtusis, base unguiculatis; staminibus exterioribus petaloideis, interioribus linearibus; capsula turbinata, 9–10 mm. longa, pedicellata, scabra; seminibus pallide brunneis, late alatis, paulo punctatis.—Kane Springs, Ord Mts., San Bernardino Co., California, 1 May 1906, *Hall & Chandler 6824* (C TYPE, M photograph).

Specimens examined:

NOTE: No authentic specimens of this species have been seen. However, due to the unusual color of the flowers, it has been maintained as a possible species. Urban and Gilg reduced it to synonymy under *M. pumila* to which it may be found to belong when additional material is available for study.

SECTION III. TRACHYPHYTUM Torrey & Gray

Section III. TRACHYPHYTUM Torrey & Gray, Fl. N. Am. 1: 533. 1840; Walpers, Rep. 2: 224. 1843; Brewer & Watson, Bot. Calif. 1: 235. 1876; Urban & Gilg in Engl. & Prantl, Nat. Pflanzenfam. 3^{6a}: 110. 1894; in Nov. Act. Nat. Cur. [Abh. K. Leop.-Carol. Deutsch. Akad. Naturf.] 76: 25. 1900.

Annuals; stems glabrous or pubescent, usually white, rarely yellowish; leaves sessile, sinuate-dentate to pinnatifid, rarely entire; flowers mostly small, in terminal cymes; petals 5, yellow or white, rarely deep yellow with vermillion base; filaments all filiform, or the outer 5 dilated, few to numerous; capsule linear-cylindrical, attenuated, sessile; placentae narrowly filiform; seeds 10–40, in 1 series, pendulous, irregularly angled, somewhat cubical, ovate to subglobose, opaque, minutely tuberculate or muriculate, not winged. Spp. 47–58.

KEY TO THE SPECIES OF SECTION TRACHYPHYTUM

- A. Stems densely scabrous.
 - B. Flowers white.
 - C. Capsule short and broad, 5–6 mm. long.....50. *M. bartonioides*
 - CC. Capsule cylindrical, 15–20 mm. long.....49. *M. Solierii*
 - BB. Flowers deep yellow.....48. *M. citrina*
- AA. Stems glabrous or nearly so (except in 52).
 - B. Subtending bracts linear-lanceolate; inflorescence not congested, not entirely concealed by bracts.
 - C. Petals 2–15 mm. long.
 - D. Capsule narrowly elongated, several times longer than broad.
 - E. Seeds irregularly angled, not grooved, or but slightly so on one angle, tuberculate.
 - F. Petals generally small, 2–8 mm. long.
 - G. Petals 2–4 mm. long; leaves entire or sinuately pinnatifid.....51. *M. albicaulis*
 - GG. Petals 5–8 mm. long; all leaves sinuately pinnatifid.
 - H. Petals 5–6 mm. long.....51b. *M. albicaulis* var. *gracilis*
 - HH. Petals 8 mm. long.....51a. *M. albicaulis* var. *ctenophora*
 - FF. Petals generally large, 5–15 mm. long.
 - G. Petals 8–14 mm. long; calyx-lobes 5 mm. long.

- H. Flowers golden-yellow; seeds slightly grooved on one angle
52. *M. gracilenta*
- HH. Flowers copper-colored at the base; seeds not definitely
 grooved on one angle.....52b. *M. gracilenta* var. *pectinata*
- GG. Petals 5-8 mm. long; calyx-lobes 3 mm. long.....
52a. *M. gracilenta* var. *Veatchiana*
- EE. Seeds regularly and sharply angled, grooved on angles, minutely
 muricate.
- F. Leaves mostly ovate-lanceolate, entire or sinuate-pinnatifid;
 petals 3-6 mm. long.
- G. Petals 3-4 mm. long.
- H. Stems loosely branched; capsules 15-25 mm. long.....
56. *M. dispersa*
- HH. Stems densely branched; capsules 10-13 mm. long.....
56b. *M. dispersa* var. *compacta*
- GG. Petals 5-6 mm. long.....56a. *M. dispersa* var. *latifolia*
- FF. Leaves lanceolate, more or less deeply pinnatifid; petals 6-8 mm.
 long.....55. *M. affinis*
- DD. Capsule shortened, nearly as broad as long.
- E. Stamens 25-30 in 2 series.....47. *M. pinnatifida*
- EE. Stamens 10-13 in 1 series.....47a. *M. pinnatifida* var. *uniseriata*
- CC. Petals 8-40 mm. long.
- D. Petals 20-40 mm. long, golden-yellow with a vermillion base.....
58. *M. Lindleyi*
- DD. Petals 8-25 mm. long, golden-yellow.
- E. Petals 15-25 mm. long.
- F. Stamens one-half the length of petals.....57. *M. nitens*
- FF. Stamens one-third the length of petals..57b. *M. nitens* var. *eremophila*
- EE. Petals 8-12 mm. long.
- F. Stems stout, shining-white; upper leaves triangular and mostly
 entire57a. *M. nitens* var. *Jonesii*
- FF. Stems slender, tenuous, green; upper leaves linear-lanceolate,
 mostly entire57c. *M. nitens* var. *leptocaulis*
- BB. Subtending bracts ovate-orbicular to ovate-lanceolate; inflorescence con-
 gested, more or less concealed by bracts.
- C. Stamens filiform; bracts membranaceous.
- D. Leaves sinuately toothed or pinnatifid.....53. *M. congesta*
- DD. Leaves mostly entire.....53a. *M. congesta* var. *Davidsoniana*
- CC. Stamens broadened; bracts leaf-like.....54. *M. micrantha*

47. *M. pinnatifida* (Phil.) Urban & Gilg in Nov. Act. Nat.
 Cur. [Abh. K. Leop.-Carol. Deutsch. Akad. Naturf.] **76**: 358.
 1900.

M. andina Urban & Gilg, *l. c.* 31. 1900.

Acrolasia bartonioides Gay, Fl. Chile **2**: 429. 1846; Wedd.
 Chlor. And. **2**: 220. 1857, not Presl.

Acrolasia pinnatifida Phil. in Anal. Univ. Chile **85**: 6. 1894.

Annual; stems solitary, erect, branched at base, 6–10 cm. long, striate, yellow to yellowish-white; lower leaves alternate, linear-lanceolate, 4–5 cm. long, sinuate-dentate to sinuate-pinnatifid, base narrowed into a petiole, the intermediate leaves sessile, 2–3 cm. long, linear-lanceolate, sinuate-dentate to sinuate-pinnatifid to subentire, scabrous on both surfaces; flowers at ends of branches; calyx-tube subcylindrical, oblong, 4–6 mm. long, scabrous; calyx-lobes ovate to ovate-oblong, acute at the apex, pilose, yellowish, persistent on the fruit; petals 5, obovate to obovate-rotund, 3–4 mm. long, glabrous; stamens 25–30, in 2 series; filaments filiform, slightly dilated at the base; style persistent on the fruit; capsule oval to oval-oblong, cylindrical, attenuated, 8–9 mm. long, brownish-black, scabrous; seeds 25–30, pendulous, irregularly angled, ovate-globose or polygonal, not winged, grayish-brown, minutely granulate-punctate.

Distribution: Chile.

Specimens examined:

CHILE: Cordilleras de las Patas, Prov. Coquimbo, 3317 m. alt., without date, Gay 662 (M photograph).

47a. *M. pinnatifida* (Phil.) Urb. & Gilg var. *uniseriata* Haumann in Anal. Soc. Cient. Argent. 86: 290. 1918.

Stems 30–40 cm. high, branched; basal leaves irregularly dentate, 15 mm. long, sessile; flowers and fruit small; petals 2–5 mm. long, pilose at apex; stamens 12–13 in one series; capsule 10–12 mm. long; seeds 15–20.

Distribution: Valley, Rio Plumo, Argentina.

Specimens examined:

NOTE: Plants more robust than is characteristic of the species. The writer has been unable to study authentic material of this variety.

48. *M. citrina* Urb. & Gilg in Nov. Act. Nat. Cur. [Abh. K. Leop.-Carol. Deutsch. Akad. Naturf.] 76: 27. 1900.

Annual, with solitary erect branched stem, 1–1.5 dm. high, brownish-white, scabrous; leaves alternate, lanceolate to linear-lanceolate, deeply sinuate-dentate to pinnatifid, base narrowed into a petiole, the intermediate leaves sessile, lanceolate to ovate-lanceolate, sinuate-dentate, rarely entire, 5–15

cm. long, upper and lower surfaces scabrous, subcanescent; flowers at ends of branches, sessile; calyx-tube about 7 mm. long, cylindrical, obtuse at base, hirsute; calyx-lobes ovate, 2.5 mm. long, pilose; petals 5, yellow, obovate, 5–6 mm. long, pilose at apex, otherwise glabrous; stamens 20, in 1 series, 3 mm. long, filaments filiform, somewhat dilated at base, glabrous; capsule cylindrical, 1–1.5 cm. long, brownish-black, scabrous, crowned with persistent withered style and calyx-lobes; seeds 15–20, irregularly angled, oblique-subovate or subglobose, brownish, minutely-punctate, not winged.

Distribution: Argentina.

Specimens examined:

ARGENTINA: Punta de la Vaca, Camino de Uspallata, Prov. Mendoza, without date, *Kurtz 3491* (M photograph).

49. *M. Solierii* (Gay) Urban & Gilg in Ber. Deut. Bot. Ges. **10**: 265, *pl. 14, fig. 6*. 1892; in Engl. & Prantl, Nat. Pflanzenfam. **3^{6a}**: 110, *fig. 37b*. 1894; in Nov. Act. Nat. Cur. [Abh. K. Leop.-Carol. Deutsch. Akad. Naturf.] **76**: 35. 1900.

Acrolasia Solierii Gay, Fl. Chile **2**: 430. 1846.

Annual, with solitary erect branched stems, 1.5–2 dm. high, striate, grayish-white or gray, scabrous; leaves alternate, lanceolate to linear-lanceolate, 3–5 cm. long, entire, rarely sinuate-dentate, base narrowed into a petiole, intermediate leaves sessile with subcordate or subamplexicaul base, mostly entire, rarely sinuate-dentate, scabrous; flowers at apex of branches, sessile; calyx-tube cylindrical to subcylindrical, attenuated, scabrous; calyx-lobes lanceolate or ovate-lanceolate, acute, 2–4 mm. long, pilose, persistent, withered, reflexed or somewhat erect on the fruit, greenish-yellow; petals 5, obovate to obovate-lanceolate, acute at the apex, attenuated or unguiculate at the base, 4–5 mm. long, white, slightly pilose; stamens 15, in 1 series, about 3 mm. long, 5 outer filaments slightly dilated, the remaining filaments filiform; style persistent on the fruit; capsule cylindrical or subcylindrical, obtuse at the base, 1.5–2 cm. long, brownish-green; seeds 15–20, irregularly angled, shortly ovate or subglobose, minutely yellow-punctate, grayish-brown, not winged.

Distribution: Chile and Argentina.

Specimens examined:

CHILE: Los Manantiales, Cordillera del Espinazito, Prov. San Juan, 2770 m. alt., without date, *Stelzner 9755* (M photograph).

50. *M. bartonioides* (Presl) Urban & Gilg in Engl. & Prantl, Nat. Pflanzenfam. 3^{ea}: 110. 1894; in Nov. Act. Nat. Cur. [Abh. K. Leop.-Carol. Deutsch. Akad. Naturf.] 76: 26. 1900.

M. Haenkii Gray in Smithson. Contr. [Pl. Wright.] 3: 74. 1852, *in obs.*

Acrolasia Bartonoides Presl, Reliq. Haenk. 2: 39, *pl.* 55. 1835; Walp. Rep. 2: 223. 1843; 5: 776. 1845-46.

Annual, with a solitary erect branched stem 1-1.5 dm. high, yellowish, terete, striate; leaves alternate, sessile or nearly so, 1.5-2.5 cm. long, pinnatifid, base subcordate, apex obtuse, the lobes ovate to ovate-oblong with revolute margins, upper and lower surfaces of the leaves scabrous and subcanescent; flowers sessile, at ends of branches; calyx-tube subcylindrical, somewhat attenuated, densely hirsute; calyx-lobes ovate, 2 mm. long, pilose, persistent in the fruit; petals 5, white, obovate, 3 mm. long, apex pilose, otherwise glabrous; stamens 10-15, in one series, 1.5-2 mm. long, slightly dilated at base, glabrous; style filiform, 2 mm. long, glabrous; capsule cylindrical, attenuated, rotund-obtuse at the base, 5-6 mm. long, pale yellow; seeds 10-15, regularly angled, subovate to subglobose, brownish, minutely punctate, not winged.

Distribution: Chile.

Specimens examined:

CHILE: Coquimbo, without date, *Philippi 734* (US).

51. *M. albicaulis* Dougl. ex Hook. Fl. Bor. Am. 1: 222. [1834] 1840; Gray in Smithson. Contr. [Pl. Wright.] 3: 74. 1852.

M. parviflora Heller in Bull. Torr. Bot. Club 25: 199. 1898.

M. tenerrima Rydb. in Mem. N. Y. Bot. Gard. 1: 271. 1900.

M. Tweedyi Rydb. *Ibid.* 1900.

Bartonia albicaulis Dougl. ex Hook. Fl. Bor. Am. 1: 222. [1834] 1840; Hook. Lond. Jour. Bot. 6: 227. 1847.

Bartonia micrantha Hook. *Ibid.* 1847.

Acrolasia tenerrima (Rydb.) Rydb. in Bull. Torr. Bot. Club 30: 277. 1903.

Acrolasia Tweedyi (Rydb.) Rydb. *Ibid.* 1903.

Acrolasia albicaulis (Dougl.) Rydb. *Ibid.* 1903.

Acrolasia viridescens Heller in *Muhlenbergia* 2: 98. 1905.

Acrolasia parviflora (Heller) Heller, *Ibid.* 1: 138. 1906.

Annual small leafy herbaceous plants 1–4 dm. high, more or less decumbent and branched at base; stems slender, white or greenish-white, shining, sparsely pubescent or puberulent below, smooth above; leaves sessile, scabrous, the lower leaves linear-ob lanceolate, 3–5 cm. long, dentate or entire, the middle leaves with several pairs of linear lobes, the upper leaves linear or lanceolate, acute, 2–3 cm. long, less deeply lobed or entire; flowers axillary, sessile, lower solitary, intermediate in pairs, and the terminal ones in corymbose clusters of 3, the two lateral on short branches and subtended by reduced leaves, middle flower naked; calyx-tube cylindrical, 10–15 mm. long, pubescent with long spreading hairs; calyx-lobes lanceolate-subulate, 2–2.5 mm. long, pale greenish-yellow; petals yellow, obovate, spathulate, 2–4 mm. long, spreading, prominently veined, emarginate; stamens shorter than petals, filaments filiform; capsule linear-cylindric, 10–15 mm. long, about 2 mm. in diameter; seeds about 30, in a single series on each placenta, tuberculate-granulate, irregularly cubical or angled.

Distribution: dry or arid sandy soil, slopes or banks, from British Columbia southward to California and New Mexico, westward from western Nebraska to the Pacific Coast.

Specimens examined:

WYOMING: Cummins, 27 July 1895, *Nelson 1455* (US); Badger, Laramie Co., 1 July 1901, *Nelson 8339* (US); Pearson's Ranch, Clark's Fork Valley, 4000 ft. alt., 11 July 1924, *Pearson 70* (RM).

COLORADO: Los Piños, 7000 ft. alt., May 1899, *Baker 467* (US); Black Canyon, Gunnison Watershed, 7000 ft. alt., 20 June 1901, *Baker 203* (US); Paradox, Montrose Co., 17 June 1912, *Walker 109* (US).

NEW MEXICO: between Santa Fe and Cononcito, 7300 ft. alt., 23 June 1897, *Heller & Heller 3750* (US); Gila River Bottoms, near Cliff, Grant Co., 4500 ft. alt., 7 May 1903, *Metcalf 51* (US); Sandia Mts., Lucero's Ranch, 700 ft. alt., 28 June 1914, *Ellis 250* (US).

IDAHO: Big Butte Station, 23 June 1893, *Palmer 578* (US); St. Anthony, 5 July 1901, *Merrill & Wilcox 840* (US); Spencer, 26 June 1916; *Rust 640* (US).

UTAH: near mouth of Salina Canyon, 5200 ft. alt., 14 June 1894, *Jones 5422C* (US); Asphalt, 5500 ft. alt., 12 July 1894, *Jones 5622* (US); Montezuma

Canyon, east of Monticello, 2000 m. alt., 13 Aug. 1911, *Rydberg & Garrett 9682* (US); canyon, Beaverdam Mts., west of St. George, 1 May 1919, *Tidestrom 9349* (US).

NEVADA: Trinity Mts., 5000 ft. alt., May 1868, *Watson 428* (US); Mica Spring, 4000 ft. alt., 13 April 1894, *Jones 50451* (US); Pyramid Lake, 28 May 1916, *Headly 16* (US); Carey Canyon, Wasatch Mts., 1850 m. alt., 27 June 1919, *Tidestrom 10100* (US).

ARIZONA: Cedar Springs, 6 July 1892, *Toumey 165* (US); Baboquivari Valley, March–April 1903, *Griffiths 3976* (US); Tubac, 13 March 1926, *Loomis 1149* (US); Prescott, 14 May 1927, *Harrison 4008* (US); near Winkelman, 30 March 1928, *Peebles, Harrison & Kearney 5170* (US).

WASHINGTON: Ritzville, Adams Co., 490 m. alt., 6 June 1893, *Sandberg & Leiberg 160* (US); Ellensburg, 20 May 1897, *Piper 2682* (US); Wenatchee Flat, 4 June 1899, *Whited 1122* (US).

OREGON: Swan Lake Valley, Klamath Co., 12 July 1902, *Walpole 2238* (US); north of Terrebonne, 2960 ft. alt., 6 Aug. 1917, *Lawrence 1092* (US); Squaw Creek, Grant Co., April–May 1925, *Henderson 5122* (US).

CALIFORNIA: Bear Valley, San Bernardino Mts., 6500 ft. alt., 19 June 1894, *Parish 3314* (US); base of White Mts., east of Law, Inyo Co., 11 May 1906, *Heller 8232* (US); Lakeside, Eldorado Co., June–July 1912, *Geis 121* (US); Cottonwood Spring, Riverside Co., 2000 ft. alt., 9 March 1920, *Jaeger 918* (US); near Blythe Junction, 1200 ft. alt., 2 April 1920, *Munz & Harwood 3461* (US); 15 miles south of Coachella, Colorado Desert, 12 April 1922, *Peirson 751* (PH); 5–6 miles north of Yermo, San Bernardino Co., 2000 ft. alt., 25 March 1932, *Peirson 9836* (M, PH, UM).

51a. *M. albicaulis* Dougl. var. *ctenophora* (Rydb.) Darlington, n. comb.

M. ctenophora Rydb. in Bull. Torr. Bot. Club **28**: 33. 1901.

Acrolasia ctenophora Rydb. *Ibid.* **30**: 277. 1903.

Stems 3–6 dm. high, diffuse to branched; lower leaves 1–2 dm. long, pectinately laciniate; calyx-lobes 4–5 mm. long; petals about 8 mm. long.

Distribution: in sandy soil from Montana and British Columbia southward to Nebraska and Arizona.

Specimens examined:

COLORADO: Florence, 7000 ft. alt., 12 June 1895, *Tweedy 104* (US); Cuchara River, below La Veta, 2100 m. alt., 30 May 1900, *Rydberg & Vreeland 5769* (RM TYPE); Evans, 1907, *Johnston* (RM).

OREGON: near Hoover Creek, Gilliam Co., 990 m. alt., 1 June 1894, *Leiberg 136* (C, F, US); Klamath Agency, 30 June 1902, *Walpole 2225* (US).

51b. *M. albicaulis* Dougl. var. *gracilis* (Rydb.) Darlington, n. comb.

Trachyphytum gracile Nutt. ex Torrey & Gray, Fl. N. Am. 1: 534. 1840; Rydb. in Bull. Torr. Bot. Club 31: 566. 1904, *nomen nudum*.

Acrolasia gracilis Rydb. l. c.

Plants usually erect; all leaves pinnatifid with many lobes; petals 5–6 mm. long.

Distribution: sandy soil on hillsides and river bottoms from Colorado northwestward to Wyoming, Idaho, and Oregon, south to California and Arizona.

Specimens examined:

WYOMING: Fort Steele, 6500 ft. alt., 10 June 1901, *Tweedy 4573* (US); Chugwater, 30 June 1909, *Cary 345* (US).

COLORADO: Salida, 7500 ft. alt., 19 June 1898, *Baker, Earle & Tracy 14* (US).

IDAHO: Pocatello, 26 May 1893, *Palmer 36* (US); Snake River Bluffs, Fayette, 22 May 1911, *Macbride 865* (US).

UTAH: Milford, 4900 ft. alt., 10–11 May 1903, *Stokes* (US); St. George, April 1880, *Jones* (US).

NEVADA: Vegas Wash, Lincoln Co., 300 m. alt., 12 March 1891, *Coville & Funston 410* (US); Calientes, 24 May 1902, *Goodding 943* (US p. p.).

ARIZONA: Verde Mesa, 1867, *Smart 119* (US); Ash Fort, 18–27 May 1903, *Griffiths 4354* (US); Santan Mts., 22 March 1926, *Peebles, Harrison & Kearney 1239* (US).

WASHINGTON: Wallula, Walla Walla Co., 23 May 1903, *Cotton 1037* (US).

OREGON: between Bear Buttes and Primeville, Crook Co., 1110 m. alt., 25 June 1894, *Leiberg 328* (US); between the Agency and Williamson River Bridge, 23 July 1902, *Coville 1216* (US); north end of Summer Lake, Lake Co., 1360 m. alt., 6 June 1911, *Eggleston 6863* (US).

CALIFORNIA: Furnace Creek Canyon, Funeral Mts., 720 m. alt., 29 Jan. 1891, *Coville & Funston 351* (US); near Campo, San Diego Co., 24 May 1903, *Abrams 3589* (ANSP, M, P, US); vicinity of Doyle Station, Lassen Co., 29 May 1911, *Eggleston 6737* (US); desert, east of Daggett, 28 May 1920, *Munz & Harwood 3649* (US).

52. *M. gracilenta* Torrey & Gray, Fl. N. Am. 1: 534. 1840; Brewer & Watson, Bot. Calif. 1: 236. 1876.

M. albicaulis Dougl. var. *gracilenta* Watson in U. S. Geol. Surv. Fortieth Parallel [Bot. King's Exp.] 5: 115. 1871; Urban & Gilg in Nov. Act. Nat. Cur. [Abh. K. Leop.-Carol. Deutsch. Akad. Naturf.] 76: 29. 1900.

Acrolasia gracilenta (T. & G.) Rydb. in Bull. Torr. Bot. Club 30: 278. 1903.

Annual, 1–4 dm. high; stems erect and strict, simple or

sparingly branched, green or greenish-white, pubescent; leaves linear-lanceolate to narrowly oblong, sessile, pinnatifid with short obtuse lobes, often entire; flowers clustered at the ends of the branches; calyx-lobes ovate-lanceolate, 4–6 mm. long; petals golden-yellow with an orange base, obovate or oblanceolate, rounded or obtuse at the apex, 8–14 mm. long; stamens numerous, about 40, filaments filiform, subulate; capsule clavate to obconic, 10–20 mm. long; seeds in 3 rows, about 20, prismatic, minutely tuberculate.

Distribution: valleys and slopes from southern Nevada southward through Inyo County to Monterey County, California.

Specimens examined:

CALIFORNIA: Atascadero, San Luis Obispo Co., without date, *Brewer 506* (US); near Ranch Jolon, Monterey Co., 7 May 1861, *Brewer 575* (US TYPE); Fort Tejon, Kern Co., 1876, *Kennedy 35* (F); Colton, San Bernardino Co., 29 April 1882, *Jones 3487* (CAS, F, M, US); near Willow Creek, Panamint Mts., Inyo Co., 7 May 1891, *Coville & Funston 748* (US); Erskin Creek, Riverside Co., April–Sept. 1897, *Purpus 5498* (C, M, US); Fremont's Peak, San Benito Co., May 1903, *Elmer 4903* (CAS, M, P, US); Vancouver Pinnacles, San Benito Co., 31 May 1915, *Hall 9961* (US); Aguanga, Riverside Co., 29 April 1922, *Munz 5113* (P).

52a. *M. gracilenta* Torr. & Gray var. *Veatchiana* (Kellogg) Jepson, Man. Fl. Pl. Calif. 652. 1925.

M. Veatchiana Kellogg in Proc. Cal. Acad. 2: 99. 1861.

M. albicaulis Dougl. var. *Veatchiana* (Kellogg) Urban & Gilg in Nov. Act. Nat. Cur. [Abh. K. Leop.-Carol. Deutsch. Akad. Naturf.] 76: 28. 1900.

Acrolasia Veatchiana (Kellogg) Rydb. in Bull. Torr. Bot. Club 30: 278. 1903.

Leaves mostly deeply pinnatifid; calyx-lobes about 3 mm. long; petals 5–8 mm. long.

Distribution: mountainous areas from Montana and British Columbia southward to California and Arizona.

Specimens examined:

COLORADO: Surface Creek, Delta Co., 6100 ft. alt., June 1892, *Purpus 80* (F); Grand Junction, Gunnison Mesa, 15 May 1916, *Eastwood 5078* (CAS); Morrison, 5800 ft. alt., 22 June 1918, *Clokey & Osterhout 3095* (CAS, M, RM).

ARIZONA: Clifton, 7 March 1881, *Rusby 138* (C); Ash Fork, May 1883, *Rusby 611* (C); from Chlorida to the River, 13 May 1931, *Eastwood 18310* (CAS, M); Keams Canyon, 14 June 1932, *Harrison 8724* (US).

NEVADA: Virginia City, without date, *Veatch* (CAS TYPE); Quinn River Crossing, July 1901, *Griffiths & Morris* 120 (US); Peavine Mountain, Washoe Co., 22 June 1909, *Heller* 9763 (ANSP, CAS, F, M, US); west of Carson City, 1800 m. alt., 5 July 1919, *Tidestrom* 10260 (P, US); desert between Winnemucca and Elko, 7 June 1930, *Van Dyke* (CAS).

OREGON: Klamath Valley, 4200 ft. alt., 1864, *Cronkhite* 46 (C, US); near Alvard Ranch, Harney Co., June–July 1927, *Henderson* 8849 (CAS).

CALIFORNIA: Soledad, 29 March 1882, *Jones* 3133 (CAS, M, P, US); San Bernardino, 13 May 1882, *Orcutt* 102 (US); Byrne's Spring, San Bernardino Mts., 4500 ft. alt., 16 June 1894, *Parish* 3312 (M); Mount Pinos Region, Ventura Co., 15 June 1896, *Dudley & Lamb* 4508 (P); Santiago Peak, Orange Co., 15 June 1901, *Abrams* 1850 (P); near Caliente, Kern Co., 7 April 1905, *Heller* 7614 (ANSP, F, M, US); Hunter's Ranch, Inyo Co., 23 May 1906, *Hall & Chandler* 7140 (RM); Tehachapi, Kern Co., 13 May 1913, *Eastwood* 3236 (CAS, US); Brown's Flat, San Antonio Mts., 4300 ft. alt., 1 July 1917, *Johnston* 1755 (P); Loyalton, Sierra Co., 29 June 1918, *Eastwood* 7795 (CAS); Barstow, desert, 13 April 1919, *Munz* 2555 (P); between Campo and Mountain Springs, San Diego Co., 24 April 1920, *Eastwood* 9549 (CAS); Granite Well, Mohave Desert, 14 May 1922, *Johnston* 6458 (P); Seymour Creek, Mount Pinos, 6300 ft. alt., 10 June 1923, *Munz* 7004 (P); 40 miles west of Mexicalli, 4000 ft. alt., 14 April 1925, *Munz* 9596 (P); 35 miles south of Randsburg, Mojave Desert, 5 April 1927, *Craig, Newsom & Hilend* 89 (P); Black Canyon, White Mts., 31 May 1930, *Duran* 550 (M); 1 mile north of Acton, Los Angeles Co., 12 May 1930, *Howell* 4872 (CAS); 2 miles northeast of Lovejoy Buttes, Mohave Desert, Los Angeles Co., 17 April 1932, *Peirson* 9862 (M, PH, UM).

The numerously branched stems, the clustered flowers at the ends of the branches, together with stiff stout capsules, make this variety fairly distinct from the species.

52b. *M. gracilenta* Torr. & Gray var. *pectinata* (Kellogg) Jepson, Man. Fl. Pl. Calif. 652. 1925.

M. pectinata Kellogg in Proc. Cal. Acad. 3: 40. 1863.

M. albicaulis Dougl. var. *pectinata* (Kellogg) Urban & Gilg in Nov. Act. Nat. Cur. [Abh. K. Leop.-Carol. Deutsch. Akad. Naturf.] 76: 29. 1900.

Acrolasia pectinata (Kellogg) Rydb. in Bull. Torr. Bot. Club 30: 278. 1903.

Leaves mostly pectinately pinnatifid; petals about 10 mm. long, copper-orange at the base; calyx-lobes 5 mm. long; seeds irregularly angled, usually not definitely grooved on one angle as in the species.

Distribution: canyons of southern California.

Specimens examined:

CALIFORNIA: San Bernardino, 1880, *Vasey 209* (F, US); bluffs of Kern River, Kern Co., 8 April 1905, *Heller 7634* (ANSP, F, M, US); Greenhorn Mts., Kern Co., 13 March 1927, *Weston 519* (CAS); Rattlesnake Grade, Greenhorn Mts., Kern Co., April 1927, *Weston 508* (CAS); Stone Canyon, east of Salinas Valley, Monterey Co., 22 March 1931, *Howell 5948* (CAS, M); 2 miles west of Maricopa, Kern Co., 20 March 1931, *Howell 5903* (CAS).

53. *M. congesta* (Nutt.) Torrey & Gray, Fl. N. Am. 1: 534. 1840; Watson, U. S. Geol. Surv. Fortieth Parallel [Bot. King's Exp.] 5: 114. 1871; Brewer & Watson, Bot. Calif. 1: 236. 1876; Greene, Fl. Francisc. 233. 1891; Urban & Gilg in Nov. Act. Nat. Cur. [Abh. K. Leop.-Carol. Deutsch. Akad. Naturf.] 76: 34-35. 1900; Macbride in Contr. Gray Herb. N. S. 56: 28. 1918; Rydberg, Fl. Rocky Mts. & Adj. Plains, ed. 2. 573. 1922; Tidestrom in Contr. U. S. Nat. Herb. [Fl. Utah & Nev.] 25: 364. 1925; Jepson, Man. Fl. Pl. Calif. 650. 1925.

Trachyphytum congestum Nutt. ex Torrey & Gray, Fl. N. Am. 1: 534. 1840.

Acrolasia congesta (Torrey & Gray) Rydb. in Bull. Torr. Bot. Club 30: 277. 1903.

Annual herbaceous plants from a slender tap-root; stems erect, 1-4 dm. high, dichotomously branched, pale yellow or white, sparingly pubescent; leaves alternate, sessile, upper and lower surfaces covered with glochidiate hairs, the margins with longer spine-like hairs, the lower leaves linear-lanceolate, base cordate, somewhat pinnatifid or incisely toothed, 5-7 cm. long, the upper leaves smaller, lanceolate, seldom incised or pinnatifid, clasping at base; flowers congested at the ends of the branches, sessile, yellow, subtended by conspicuous bracts; the bracts 3-lobed or toothed, broadly ovate, 0.6-1.8 cm. long, with the central portion white-membranaceous, the lobes or teeth of the bracts bright green, the margins ciliated, nearly concealing the cluster of 3-5 flowers and enclosing a pair of smaller bracteoles situated at the base of the calyx-tube; calyx-tube cylindrical, slightly attenuated at the base, densely covered with long glochidiate, barbed and spine-like hairs; calyx-lobes 5, lanceolate to ovate-lanceolate, 2-3 mm. long, also covered with glochidiate, barbed and spine-like hairs, persistent and erect on the fruit; petals 5, pale yellow above,

orange below, obovate, rotund at apex, 4–5 mm. long, 2–3.5 mm. broad, slightly emarginate, mostly glabrous; stamens about 20, in 1 or 2 series, filaments all filiform, incurved when young, 2.5–3 mm. long, somewhat broadened at the base, apex of anther slightly emarginate; style 2.5–3.5 mm. long, persistent on the fruit; capsule erect, cylindrical, attenuated at base, 7–10 mm. long, dark, with the persistent calyx-lobes and style obscurely striated; seeds about 20, irregularly ovate-orbicular, irregularly angled, not winged, brownish, minutely granulate-punctate, 1–1.3 mm. long, about 1 mm. broad.

Distribution: on dry hillsides, not common, in Idaho, Nevada, and California.

Specimens examined:

IDAHO: Lewis River, Rocky Mts., without date, *Nuttall* (ANSP TYPE).

NEVADA: Toyabe Mts., 6000 ft. alt., July 1868, *Watson 431* (US); Empire City, 20 June 1882, *Jones 3871* (CAS, M, P, US); Miller Mt., 7000 ft. alt., June 1885, *Shockley* (F); Carson City, 5000 ft. alt., 2 June 1897, *Jones* (P); Sierra Valley, 29 Aug. 1898, *Hillman* (P); Carson, 5 June 1890, *Hillman* (P); about Carson, June 1891, *Hillman* (P); hills north of Reno, 5500 ft. alt., 20 June 1900, *Stokes* (US); Dinsmore Camp, Hunter Creek Canyon, 6000 ft. alt., 20–25 June 1917, *Kennedy 1640* (CAS); Mount Rose, Washoe Co., 9500 ft. alt., 26 Aug. 1911, *Heller 10335* (US); mountains west of Franktown, Washoe Co., 5500 ft. alt., 2 July 1912, *Heller 10518* (US); north of Verdi, Washoe Co., 5300 ft. alt., 24 June 1913, *Heller 10874* (ANSP, C, F, M, US); Skyland Camp, near Glenbrook, Lake Tahoe, 29 June 1928, *Jussel* (CAS).

CALIFORNIA: Sierra Valley, without date, *Lemmon* (C); Sierra Co., coll. of 1874, *Lemmon 95* (ANSP, M); Green Horn Mts., Kern Co., 6000–7000 ft. alt., 7–15 June 1888, *Palmer 46* (US); Honey Lake Valley, Lassen Co., collection of 1890, *M. S. Baker* (C); range of Sierras east of Minarets, 19–22 Aug. 1899, *Congdon* (C); Avalon, Catalina Island, 28 June 1902, *Diehl 259* (P); Bonita Meadow, Tulare Co., 8500 ft. alt., 20–24 June 1904, *Hall & Babcock 5203* (ANSP); Palomar Mt., San Diego Co., 4800 ft. alt., 9 July 1904, *Chandler 5427* (C); Mount Breckenridge, Kern Co., 14 June 1905, *Grinnell 250* (US); Bishop Creek, Inyo Co., 6000 ft. alt., 31 May 1906, *Hall & Chandler 7254* (C); Sand Harbor, Lake Tahoe region, 1909, *Eastwood 209* (CAS); south side of Surprise Canyon, near Panamint City, Panamint Mts., Inyo Co., 7800 ft. alt., 14 June 1928, *Howell 3916* (CAS); dry sandy areas, Rock Creek, 5 miles north of Sherwin Grace, Mono Co., 21 June 1928, *Munz 11073* (P); 4 miles above Mono Lake, 1 July 1929, *Newsom* (B); June Lake, Mono Co., 5 July 1929, *Wright* (P).

53a. *M. congesta* (Nutt.) Torrey & Gray var. *Davidsoniana* (Abrams) Macbride in Contr. Gray Herb. N. S. 56: 28. 1918.
M. Davidsoniana Abrams, Fl. Los Angeles, 235. 1917.

Acrolasia Davidsoniana Abrams in Bull. Torr. Bot. Club **32**: 538. 1905.

Annual, erect, 2–3 dm. high; leaves somewhat pinnatifid to nearly entire; calyx-lobes lanceolate, 3 mm. long; petals 8 mm. long; bracts conspicuous, mostly scarious, narrow, concealing the capsules; seeds irregularly angled, only occasionally grooved.

Distribution: in open, pine forests of Nevada and California.

Specimens examined:

NEVADA: Slide Mt., Washoe Co., 7800 ft. alt., 11 July 1910, *Heller 10202* (CAS); between Minden and Lake Tahoe, 1 July 1929, *Newsom* (P).

CALIFORNIA: Pah Ute Peak, 7000–8000 ft. alt., April–Sept. 1897, *Purpus 5286* (M, US); Coldwater Fork of Lytle Creek, San Antonio Mts., 7 July 1918, *Johnston 2059* (P); Big Rock Creek, San Gabriel Mts., 4200 ft. alt., 25 May 1923, *Munz 6799* (P); Mount Wilson, 30 June 1902, *Abrams 2580* (P).

54. *M. micrantha* (Hook. & Arn.) Torrey & Gray, Fl. N. Am. **1**: 535. 1840; Walp. Rep. **2**: 225. 1843; Watson, U. S. Geol. Surv. Fortieth Parallel [Bot. King's Exp.] **5**: 114. 1871; Brewer & Watson, Bot. Calif. **1**: 236. 1876; Greene, Fl. Francisc. **233**. 1891; Urban & Gilg in Nov. Act. Nat. Cur. [Abh. K. Leop.-Carol. Deutsch. Akad. Naturf.] **76**: 37–38. 1900; Jepson, Man. Fl. Pl. Calif. 650. 1925.

M. micrantha (Hook. & Arn.) Torrey & Gray var. *stricta* Davidson in Davidson & Moxley, Fl. South. Calif. 239. 1923.

Bartonia micrantha Hook. & Arn. in Bot. Beechey Voy. 343. 1840.

Acrolasia micrantha (Torr. & Gray) Rydb. in Bull. Torr. Bot. Club **30**: 278. 1903.

Acrolasia micrantha (Torr. & Gray) Rydb. var. *stricta* Davidson in Bull. So. Calif. Acad. Sci. **5**: 15. 1906.

Acrolasia Catalinensis Millsp. in Field Mus. Nat. Hist. Publ. Bot. **5**: 177. 1923.

Annual herbaceous plants from a stout tap-root; stems erect, more or less freely branching, simple below, dichotomous above, 10–45 cm. high, yellow or nearly white, somewhat pubescent below, hispid above with glochidiate and spine-like hairs; lower leaves alternate, ovate to lanceolate, 1–9 cm. long, 1.2–1.6

cm. broad, sinuately toothed or serrate, acute or acuminate at the apex, base often narrowed into a slender petiole, middle and upper leaves sessile, subcordate at the base, lanceolate or ovate-lanceolate to ovate, acute at the apex, 2.5–14 cm. long, 0.6–3.5 cm. broad, inconspicuously or deeply sinuate-toothed, upper surface of leaves covered with antrorse tuberculate-hispid hairs intermixed with glochidiate hairs, the lower surface densely covered with glochidiate hairs and a few antrorse spine-like hairs; flowers sessile, congested into compact cymose clusters at the apex of the branches, rarely corymbose, cymes 3–5-forked, as long as or slightly exceeding the floral bracts; bracts and bracteoles ovate to ovate-orbicular, obtuse at the apex, 0.3–1.4 cm. long, entire or slightly dentate, yellowish-green, scabrous; calyx-tube usually concealed by floral bracts, cylindrical, not attenuated, obtuse at base, 3–4 mm. long, terete or subangular, densely covered with long verticillate glochidiate antrorse spine-like hairs; calyx-lobes small, lanceolate, acute, 2 mm. long, 0.8–1 mm. broad, persistent and erect in fruit, yellowish, pubescence the same as on the calyx-tube; petals 5, imbricated, obovate to obovate-rotund, 3–3.5 mm. long, 2–3 mm. broad, attenuated at base, sparsely pilose near the apex, otherwise glabrous; stamens 10–20, in 1 series, the 5 stamens opposite the petals short, 2.5 mm. long, about 1.5 mm. broad, apex tricuspidate, middle cusp antheriferous, the two outer cusps shorter and sterile, the remaining filaments filiform, about 3 mm. long, slightly dilated at the base; style 3–4 mm. long, filiform, smooth, angled, apex and margins slightly pilose, persistent on the fruit; capsule cylindrical or quadrangular, not attenuated, obtuse at the base, about 1 cm. long, 2–2.5 mm. broad, brownish-green to brownish-black, papery or somewhat leathery, with persistent calyx-lobes and style; seeds 5–8, in 1 series on the narrow placentae, not compressed, mottled brown, minutely yellow-punctate, not winged, 1.5 mm. long and nearly as broad.

Distribution: dry hillsides and rocky canyons of the Coast Range Mountains in California from Trinity County southward throughout southern California, adjacent islands, and northern Lower California.

Specimens examined:

CALIFORNIA: TRINITY COUNTY—near Big Bar, 1400 ft. alt., 29 June 1923, *Tracy 6425* (C); LAKE COUNTY—southeast side of Snow Mt. above Bonnie View, 7 June 1919, *Heller 13237* (ANSP, CAS, F, M, US); SANTA CLARA COUNTY—Saratoga, Sept. 1893, *Burt-Davy 245* (C); Black Mt., July 1903, *Elmer 4588* (C, CAS, M, P, US); MONTEREY COUNTY—Santa Lucia Mts., July and Aug. 1880, *Vasey 207* (US); Mt. Diablo, 30 May 1920, *Sutcliffe* (CAS); SANTA BARBARA COUNTY—trail to Zaca Peak, Zaca Lake Forest Reserve, 19–30 June 1906, *Eastwood* (CAS); Mono Creek, 2500 ft. alt., 19 May 1907, *Hall 7794* (C); VENTURA COUNTY—Ojai and vicinity, 600 ft. alt., 22 May 1866, *Peckham* (US); base of bluffs, Point Mugu, 21 April 1928, *Howell 3749* (CAS); Santa Susana Pass, 29 May 1931, *Howell 6577* (CAS); LOS ANGELES COUNTY—sandy washes in canyons, Sierra Santa Monica, April–May 1890, *Hasse* (M, P, US); banks of San Gabriel River, 600 m. alt., 8 May 1898, *Leiberg 3382* (US); foothills near Sherman, 12 May 1901, *Braunton 55* (US); Monrovia, 14 June 1904, *Grant 6424* (C, F, RM); San Fernando Wash, 11 May 1913, *Eastwood 3161* (CAS); Griffith Park, 12 June 1915, *Macbride & Payson 817* (RM); Topanga Canyon, Santa Monica Mts., 3 June 1916, *Hiatt* (P, US); Rubio Canyon, San Gabriel Range, 1800 ft. alt., 12 June 1918, *Peirson 119* (PH); east trail to Mt. Lowe, 3500 ft. alt., 14 May 1919, *Peirson 2302* (PH); burned-over area, San Dimas Canyon, 1500 ft. alt., 29 April 1920, *Munz & Harwood 3796* (P, RM, US); North Fork San Gabriel, 3000 ft. alt., 20 June 1921, *Peirson 2465* (PH); Fish Canyon, San Gabriel Mts., 1750 ft. alt., 21 May 1923, *Peirson 4450* (PH); San Gabriel Canyon, 1000 ft. alt., 23 April 1925, *Munz 9416* (P); near La Canada, 12 June 1926, *Reed 5240* (P); Soledad Canyon road at junction with Mint Canyon Road, 19 June 1927, *Craig 470* (P); Mandeville Canyon, near Santa Monica, 3 March 1928, *Bryan 70* (P); Los Alisos Canyon, Santa Monica Mts., 18 April 1931, *Epling* (M); Santa Catalina Island, 13 May 1890, *Brandegge* (CAS); Avalon, May 1895, *Trask* (US); Peebles Beach Road, 25 ft. alt., 31 May 1912, *Smith 5054* (F); SAN BERNARDINO COUNTY—desert washes, San Bernardino, 1880, *Parish & Parish 214* (ANSP); foothills, San Bernardino, May 1886, *Parish 214 A* (M); Waterman Canyon, San Bernardino Mts., 3000 ft. alt., 29 June 1894, *Parish 3486* (M, US); vicinity of San Bernardino, 1500 ft. alt., 11 May 1901, *Parish 4775* (P, US); southern slopes of San Bernardino Mts., 1700 ft. alt., 24 May 1909, *Parish 7105* (C); Cucamonga Canyon, 14 July 1915, *Davis 549* (P); Cucamonga Canyon, on ridge above Charcoal Camp, San Antonio Mts., 4700 ft. alt., 30 June 1918, *Johnston 2051* (P); Arrowhead Canyon near San Bernardino, 2000 ft. alt., 14 May 1919, *Spencer 1143* (CAS, P); San Dimas Canyon, 1500 ft. alt., 21 April 1921, *Munz & Harwood 3703* (P); San Bernardino Mts., 15 Aug. 1923, *Jones* (P); Arrowhead Springs, 1450 ft. alt., 7 May 1924, *Feudge 811* (P); Casey Trail to San Sevaine flats, San Antonio Mts., 3000 ft. alt., 10 July 1925, *Johnston* (P); Hesperia, 20 May 1929, *Jones* (P); RIVERSIDE COUNTY—Temecula Creek, 1 June 1899, *Hall 1219* (C); Santiago Peak Trail, Santa Ana Mts., 30 May 1931, *Howell 6589* (CAS); ORANGE COUNTY—Claymine Canyon, north of Santa Ana Mts., 1000 ft. alt., 3 July 1927, *Howell 2642* (CAS); SAN DIEGO COUNTY—San Clemente Canyon, dry slope of canyon south of "Lemon Tank," 10 April 1923, *Munz 6749* (P).

LOWER CALIFORNIA: Sanzel, 7 May 1883, *Orcutt & Fish* (US); Tia Juana Can-

yon, Guadalupe Island, in ravines at middle and south end of island, *Palmer 32* (M); 20 March 1897, *Anthony & Brandegees 259* (C, F, M, P, US).

55. *M. affinis* Greene in *Pittonia* 2: 103. 1890; Greene, *Man. Bot. Reg. San Francis. Bay*, 141. 1894; Abrams, *Fl. Los Angeles & Vic.* 256. 1904; Jepson, *Fl. West. Mid. Calif.* 322. 1901, ed. 2. 268. 1911; Jepson, *Man. Fl. Pl. Calif.* 651. 1925; Macbride in *Contr. Gray Herb. N. S.* 56: 25–26. 1918.

Acrolasia affinis (Greene) Rydb. in *Bull. Torr. Bot. Club* 30: 278. 1903.

Annual herbaceous plants from a slender tap-root, coarse, robust; stems usually white and shining, glabrous below, sparingly pubescent above with short glochidiate hairs, often simple and leafy below, widely branching above; leaves alternate, lanceolate or ovate-lanceolate, acute or obtuse at the apex, broadly lanceolate at the base, 2–9 cm. long, deeply sinuate-pinnatifid, or rarely almost entire, sessile, upper surface armed with jointed, straight or curved spine-like hairs with bulbous bases, the lower surface more densely covered with short slender barbed glochidiate hairs; flowers numerous, solitary in the forks of, or terminating, the branches; calyx-lobes attenuate-subulate, about 5–6 mm. long, spreading and mostly recurved at maturity; calyx-tube linear, subterete, 15–25 mm. long, clothed with stiff white barbed glochidiate hairs intermixed with long spine-like hairs with bulbous bases; petals yellowish-white, 6–8 mm. long, obovate with the base broadly spathulate; stamens 25–40, filaments linear; seeds short-prismatic, definitely grooved on the three angles, surfaces muriculate or muricate, often obliquely truncate at each end.

Distribution: in sandy or stony places in southwestern Arizona and central and southern California.

ARIZONA: Tucson Mts., 20 June 1892, *Toumey 163* (US); Tucson Mts., vicinity of Tucson, 11 April 1913, *Greenman & Greenman 46* (M); Tucson, 21 March 1919, *Eastwood 8067* (CAS).

CALIFORNIA: desert, southern California, 1881, *Parish & Parish 629* (F); SAN JOAQUIN COUNTY—Tracy, 10 April 1892, *Michener & Bioletti* (US); in sandy bottoms, Tracy, 25 April 1903, *Baker 2781* (CAS, F, M, P, RM, US); FRESNO COUNTY—7 miles southwest of Coalinga, 23 March 1925, *Munz 9157* (P); KERN COUNTY—Maricopa Hills, 15 May 1913, *Eastwood* (CAS); Caliente Creek, north base of Tehachapi Pass, 19 March 1925, *Munz 8987* (P); LOS ANGELES COUNTY—Mount

Black Jack, Santa Catalina Island, May 1896, *Trask* (M); Pasadena, May 1901, *Grant* 773 (US); Playa del Rey, March 1903, *Braunton* 866 (US); Santa Catalina Island, 20-25 July 1917, *Eastwood* 6478 (CAS); between Lancaster and Victorville, 27 April 1930, *Hart* (CAS); VENTURA COUNTY—Simi, May 1902, *Hall* 3236 (P); ORANGE COUNTY—hills back of Santa Ana, 1900, *Geis* 517 (P); RIVERSIDE COUNTY—Hemet, May 4, 1904, *Baker* 4141 (P); vicinity of Riverside, 1200 ft. alt., April 1903, *Hall* 3829 (RM); Wrights, 17 miles west of Los Banos, 3 April 1912, *Wootton* (US); Chuckawalla Bench, Colorado Desert, 1200 ft. alt., 29 March 1922, *Jaeger* 816 (US); SAN DIEGO COUNTY—dry hillsides near Tia Juana, 14 May 1903, *Abrams* 3477 (M, P); IMPERIAL COUNTY—Indian Wells, Colorado Desert, 14 April 1922, *Munz & Keck* (P).

56. *M. dispersa* Watson in Proc. Am. Acad. **11**: 137. 1876; Brewer & Watson, Bot. Calif. **1**: 236. 1876; Greene, Fl. Francisc. 232. 1891; Howell, Fl. N. W. Am. **1**: 240. 1897; Coulter & Nelson, Man. Bot. Rocky Mts. 325. 1909; Macbride in Contr. Gray Herb. N. S. 56: 25. 1918; Rydberg, Fl. Rocky Mts. & Adj. Plains, ed. 2. 574. 1922; Jepson, Man. Fl. Pl. Calif. 651. 1925.

M. albicaulis Dougl. var. *integrifolia* Watson in U. S. Geol. Surv. Fortieth Parallel [Bot. King's Exp.] **5**: 114. 1871.

M. integrifolia (Wats.) Rydb. in Mem. N. Y. Bot. Gard. **1**: 271. 1900.

M. albicaulis Dougl. var. *genuina* Urban & Gilg in Nov. Act. Nat. Cur. [Abh. K. Leop.-Carol. Deutsch. Akad. Naturf.] **76**: 28. 1900.

M. pinetorum Heller in Bull. So. Cal. Acad. Sci. **2**: 69. 1903.

M. dispersa Wats. var. *obtusa* Jepson, Man. Fl. Pl. Calif. 651. 1925.

M. dispersa Wats. var. *pinetorum* Jepson, *Ibid.* 1925.

Acrolasia integrifolia (Wats.) Rydb. in Bull. Torr. Bot. Club **30**: 278. 1903.

Acrolasia pinetorum Heller in Muhlenbergia **2**: 99. 1905.

Acrolasia dispersa (Wats.) Davidson in Bull. So. Cal. Acad. Sci. **5**: 14. 1906.

Acrolasia montana Davidson, *Ibid.* 18. 1906.

Acrolasia desertorum Davidson, *Ibid.* 16. 1906.

Acrolasia albicaulis Dougl. var. *integrifolia* (Wats.) Daniels, Fl. Boulder, Colo. 174. 1911.

Annual, 1-3 dm. high; stems slender, erect, usually sparsely branched, smooth below, puberulent above; lower leaves nar-

rowly lanceolate, entire, the middle leaves ovate-lanceolate, sinuate-dentate, rarely pinnatifid, the uppermost leaves ovate, entire, all leaves sessile; flowers small, mostly approximate toward the ends of the branches; calyx-lobes about 2 mm. long, persistent and erect in the mature fruit; petals obovate or spathulate, 3–4 mm. long; stamens 15–40, filaments filiform; capsule narrowly linear-clavate, 15–25 mm. long; seeds few, in a single row on each placenta, prismatic to somewhat rhomboidal, grooved on the angles, grayish-green, minutely muriculate, appearing almost smooth to the naked eye.

Distribution: sandy soil from Montana to Colorado, west to Washington, south to southern California.

Specimens examined:

MONTANA: Spanish Basin, 24 June 1897, *Rydberg & Bessey 4544* (F, RM, UM, US); Prickly Pear Canyon, 23 July 1887, *Williams 687* (US); Midvale, 27 July 1903, *Umbach 549* (F, US); Bozeman, June–Sept. 1905, *Blankinship 205* (ANSP, F, M, P, RM, UM, US).

WYOMING: Laramie Hills, 10 July 1891, *Buffum 346* (RM); Pole Creek, 30 June 1895, *Nelson 1375* (M, RM, US); Cummings, 28 July 1895, *Nelson 1455* (RM); Mammoth Hot Springs, 20 July 1899, *Nelson & Nelson 6006* (M, RM, US); Silver Gate, 24 July 1902, *Mearns 2252* (US); east of Afton, Lincoln Co., 30 June 1923, *Payson & Armstrong 3315* (ANSP, M, P, RM).

COLORADO: indefinite locality, 1868, *Vasey 195* (US TYPE); near Boulder, 6 July 1892, *Patterson 209* (F, M); near Hot Sulphur Springs, 3–8 Aug. 1907, *Ramaley & Robbins 3578* (RM); Morrison, 22 June 1918, *Clokey & Osterhout 3100* (CAS, M, P, RM); Boulder Canyon, 18 July 1921, *Clokey & Bethel 4216* (RM, US).

IDAHO: above Lewiston, 9 May 1892, *Sandberg, MacDougal & Heller 144* (ANSP, CAS, F, US); Lake Waha, Nez Perces Co., 21 June 1894, *Henderson 2714* (RM, US); Cedar Mountain, Latah Co., May 1897, *Elmer 787* (M, RM, US); Salmon, Lemhi Co., 23 June 1920, *Payson & Payson 1757* (CAS, RM).

UTAH: Antelope Island, June 1869, *Watson 430* (US); American Fork Canyon, 28 July 1880, *Jones 1461* (F, P); Asphalt, 12 July 1894, *Jones 5622* (US); Logan Canyon, Cache Co., 27 June 1909, *Smith 1709* (RM).

NEVADA: Glenbrook, Douglas Co., 22 July 1902, *Baker 1345* (CAS, F, M, P, RM, US); Carson sink region, Churchill Co., 15 July 1908, *Kennedy 1775* (CAS); Peavine Mountain, Washoe Co., 22 June 1909, *Heller 9763* (CAS); Hunter's Canyon, near Reno, 18 July 1913, *Hitchcock 542* (US).

WASHINGTON: Tumwater Canyon, Wenatchee River, 21 July 1893, *Sandberg & Leiber 519* (ANSP, CAS, M, US); Charles Springs, Spokane Co., 8 July 1902, *Kreager 115* (M, US); Lookout Mountain, near Leavenworth, Chelan Co., 23 May 1913, *Thompson 6508* (M).

OREGON: Dalles, 10 June 1869, *Kellogg & Harford 292* (M, US); Swan Lake Valley, Klamath Co., 14 June 1896, *Applegate 213* (US) near Maupin, Wasco Co.,

28-30 July 1922, *Abrams 9545* (P); Madras, Jefferson Co., 3 July 1931, *Howell 7177* (CAS).

CALIFORNIA: Yosemite National Park, June-Sept. 1866, *Bolander 4863* (F, M, US); Colton, San Bernardino Co., 28 April 1882, *Jones 2729* (P, US); near Havilah, Kern Co., 24 June 1891, *Coville & Funston 1086* (US); near Edgewood, Siskiyou Co., 28-31 July 1892, *Palmer 2574* (US); Frazier Mt., Ventura Co., 17 June 1896, *Dudley & Lamb 4570* (P); Pah Ute Peak, April-Sept. 1897, *Purpus 5102* (M, US); near Lily Lake, Eldorado Co., 23 July 1906, *Eastwood 897* (CAS); east of Red Clover Valley, Plumas Co., 4 July 1907, *Heller & Kennedy 8722* (ANSP, CAS, F, M, US); Deer Park, Placer Co., 15-19 June 1912, *Eastwood 683* (ANSP, CAS); Icehouse Canyon, San Antonio Mts., 30 July 1917, *Johnston 1602* (P); Palomar Mts., San Diego Co., 22 June 1924, *Munz 8293* (P); Surprise Canyon, Panamint Mts., Inyo Co., 14 June 1928, *Howell 3917* (CAS); Mather, Tuolumne Co., 28 May 1931, *Keck 1111* (CAS).

56a. *M. dispersa* Watson var. *latifolia* (Rydb.) Macbride in Contr. Gray Herb. N. S. 56: 26. 1918.

M. latifolia (Rydb.) Nels. in Coulter & Nelson, Man. Bot. Rocky Mts. 324. 1909.

Acrolasia latifolia Rydb. in Bull. Torr. Bot. Club 31: 567. 1904.

Leaves coarsely toothed or entire, 5-10 cm. long; calyxlobes 2.5-3 mm. long; petals obovate-spathulate, 5-6 mm. long; capsule linear-cylindrical, 2.5-3 cm. long.

Distribution: foothills and mountains, Colorado, Wyoming and west to Washington and south to central California.

Specimens examined:

WYOMING: Birdseye, 20 June 1920, *Nelson 9408* (M, P, RM, US).

COLORADO: along the Platte River, 12 June 1878, *Jones 220* (M, P); Rist Canyon, 29 June 1890, *Crandall 139* (US); between Sunshine and Ward, Aug. 1902, *Tweedy 5149* (RM); Morrison, Jefferson Co., 27 June 1920, *Clokey 3825* (ANSP, CAS, F, M, P, RM, US).

IDAHO: Kootenai Co., July 1888, *Sandberg* (F); Ketchum, Blaine Co., 20 July 1911, *Nelson & Macbride 1248* (F, M, P, RM, US).

UTAH: Wahsatch, 10 Aug. 1898, *Mulford 288* (M); Salt Lake City, July 1899, *Jones 1461* (F).

NEVADA: north of Verdi, 24 June 1913, *Heller 10870* (ANSP, F, M, US).

WASHINGTON: Whitman Co., 28-30 May 1904, *Beattie & Lawrence 2356* (ANSP); near Dog Creek, Skamania Co., 2 July 1923, *Suksdorf 11485* (ANSP, CAS, M).

OREGON: on Pine Creek, Gilliam Co., 8 June 1894, *Leiberg 188* (C, US); Dalles, Wasco Co., 23 May 1910, *Heller 10079* (C, CAS); Baker, 17-21 June 1916, *Eggleston 12621* (US); north of Dufur, Wasco Co., 3 July 1931, *Howell 7188* (CAS).

CALIFORNIA: Truckee, Nevada Co., 18 June 1885, *Sonne 117* (ANSP); lower end

of Donner Lake, Nevada Co., 8 July 1903, *Heller 6865* (ANSP, M, P, RM, US); Loyalton, Sierra Co., 29 June 1918, *Eastwood 7796* (CAS).

56b. *M. dispersa* Watson var. *compacta* (Nels.) Macbride in Contr. Gray Herb. N. S. 56: 26. 1918.

M. compacta Nelson in Bull. Torr. Bot. Club **25**: 275. 1898.

Acrolasia compacta (Nels.) Rydb. in Bull. Torr. Bot. Club **30**: 278. 1903.

Stems low, compactly and numerous branched, whitish, pilose; leaves numerous, entire, obtuse, ovate-oblong, 1–3 cm. long, rough-hirsute; flowers yellow, sessile, small, in compact cymes at the ends of the branches; petals obovate, 3–4 mm. long; capsule linear-clavate, 10–13 mm. long; seeds 10–12.

Distribution: plains and foothills of Wyoming and Colorado westward to Washington and southward to California.

Specimens examined:

MONTANA: Craig, 21 June 1900, *Wilcox 322* (US); near Glacier Park Station, 15 Aug. 1919, *Standley 17667* (US); north of Windsor, 22 Aug. 1931, *Howell 7908* (CAS).

WYOMING: Parkman, 22 July 1896, *Nelson 2454* (M, RM); Mammoth Hot Springs, 20 July 1899, *Nelson & Nelson 6013* (M, RM, US); Moorcroft, Crook Co., 2 Aug. 1901, *Nelson 8552* (M, P, RM, US).

COLORADO: near Boulder, 6 July 1892, *Patterson 210* (US); Steamboat Springs, 10 Aug. 1898, *Shear & Bessey 4036* (US); near Boulder, July 1902, *Tweedy 5150* (RM).

IDAHO: Mannis Creek, Washington Co., 8 July 1899, *Jones 6324* (M, P, US); Squaw Creek, Custer Co., 23 July 1916, *Macbride & Payson 3384* (CAS, M, P, RM, US).

57. *M. nitens* Greene, Fl. Francisc. 234. 1891; Urban & Gilg in Nov. Act. Nat. Cur. [Abh. K. Leop.-Carol. Deutsch. Akad. Naturf.] 76: 360. 1900.

Acrolasia nitens (Greene) Rydb. in Bull. Torr. Bot. Club **30**: 278. 1903.

Annual or perennial, loosely spreading; lower branches somewhat decumbent, 3–6 dm. high; stems very white, shining; leaves few, thin, pinnately divided, linear-lanceolate; flowers solitary in the upper forks of the branches, somewhat clustered at the ends of the branches; petals oblong-obovate, obtuse or emarginate, 1.5–2.5 cm. long; stamens half the length of the petals, filaments subulate; capsule linear-clavate, 2–3.5 cm. long, hispid; seeds tuberculate, sharply angled.

Distribution: sheltered localities from western Arizona to southern California.

Specimens examined:

ARIZONA: Santa Catalina Mts., 16 March 1911, *Blumer 4247* (US); Yucca, 12 March 1912, *Wootton* (US); Kingman to Hillside, 24 March 1931, *Harrison, Kearney & Fulton 7630* (US); Fort Mohave, 23 March 1931, *Harrison, Kearney & Fulton 7568* (US).

CALIFORNIA: near Pete's Garden, Johnson Canyon, Panamint Mts., Inyo Co., 31 March 1891, *Coville & Funston 523* (US); west of Hesperia, San Bernardino Co., 17 May 1920, *Johnston 2306* (P, US); vicinity of Corn Spring, Chuckawalla Mts., Colorado Desert, 9-12 April 1922, *Munz & Keck 4886* (CAS, P).

57a. *M. nitens* Greene var. *Jonesii* (Urb. & Gilg) Darlington, n. comb.

M. albicaulis Dougl. var. *Jonesii* Urb. & Gilg, Nov. Act. Nat. Cur. [Abh. K. Leop.-Carol. Deutsch. Akad. Naturf.] **76**: 29. 1900.

M. albicaulis Dougl. var. *spectabilis* Jones, Contr. West. Bot. **12**: 16. 1908.

Stems semi-decumbent toward the base, stout, whitish, shining; lower leaves deeply pinnately lobed, the upper leaves triangular and mostly entire; petals 8-12 mm. long, bright yellow.

Distribution: canyons and slopes, southern Utah and Arizona and Owen's Valley, California.

Specimens examined:

UTAH: Santa Clara, 28 April 1894, *Jones 5116* (C, M, P, RM, US).

ARIZONA: Yucca, 1884, *Jones 3900* (CAS, F, P, US); Yarnell Hill, near Prescott, 14 April 1927, *Harrison 3980* (US); between Superior and Kelvin, 30 March 1928, *Peebles, Harrison & Kearney 5164* (US); near Wickenburg, 31 March 1930, *Peebles & Loomis 6731* (US).

57b. *M. nitens* Greene var. *eremophila* (Jepson) Darlington, n. comb.

M. Lindleyi Torrey & Gray var. *eremophila* Jepson, Man. Fl. Pl. Calif. 650. 1925.

Petals rounded at the apex with a very slight acumination, 1.5-2.5 cm. long; stamens about one-third as long as the petals.

Distribution: desert mesas, Inyo and Kern Counties, California.

Specimens examined:

CALIFORNIA: Randsburg, 14 April 1905, *Heller 7692* (ANSP, F, M, US); Red

Rock Canyon, Mohave Desert, 8 May 1929, *Hoffmann* (CAS); Red Rock Canyon, Mohave Desert, 13 May 1930, *Howell 4935* (CAS).

This appears to be an intermediate variety between the species *nitens* and *Lindleyi*. However, its habit, flower, and shape of capsule would seem to indicate that it is more closely allied with *Mentzelia nitens*, to which it is here referred.

57c. *M. nitens* Greene var. *leptocaulis* Darlington, n. var.³⁹

Stems slender, flexuous, 12–20 cm. high; leaves thin, linear-lanceolate, 3–4 cm. long, puberulent, subtending leaf elongated; flowers small, mostly solitary; petals 8–10 mm. long.

Distribution: valley of the Colorado River, Arizona.

Specimens examined:

ARIZONA: Williams Fork, 11 March 1876, *Palmer 157* (F, M TYPE, US).

58. *M. Lindleyi* Torrey & Gray, Fl. N. Am. 1: 533. 1840; Brewer & Watson, Bot. Calif. 1: 236. 1876; Greene, Fl. Francisc. 234. 1891; Jepson, Man. Fl. Pl. Calif. 652. 1925.

M. Bartonica Steud. Nomencl. ed. 2, pt. 2. 128. 1841.

M. crocea Kellogg in Proc. Cal. Acad. 7: 110. 1876.

M. aurea Baill. Hist. Pl. 8: 461, fig. 309–310. 1886; Urb. & Gilg in Nov. Act. Nat. Cur. [Abh. K. Leop.-Carol. Deutsch. Akad. Naturf.] 76: 33. 1900.

Bartonia aurea Lindley in Bot. Reg. 22: pl. 1831. 1836.

Chrysostoma aurea Lilja, Fl. Sver. Suppl. 1: 33. 1840.

Creolobus aurea Lilja, Fl. Sver. 67. 1839; Linnaea 15: 264. 1841.

Acrolasia aurea (Lindl.) Rydb. in Bull. Torr. Bot. Club 30: 278. 1903.

Annual, 1–6 dm. high, hispid; stems slender, simple or branched; leaves ovate to narrowly lanceolate, sessile, slightly clasping at base, 4–7 cm. long pectinately pinnatifid, with entire or toothed, lanceolate or linear lobes, the terminal lobe prolonged and mostly acute; flowers solitary or in clusters of 2 or 3 at the ends of the branches, axillary or terminal; calyx-

³⁹ *M. nitens* Greene var. *leptocaulis* Darlington, var. nov., caulibus tenuibus, flexuis, 12–20 cm. altis; foliis tenuibus, lineari-lanceolatis, 3–4 cm. longis, puberulis, folio subtento elongato; floribus parvis, plerumque solitariis; petalis 8–10 mm. longis.—Williams Fork, Arizona, 11 March 1876, *Palmer 157* (F, M TYPE, US).

lobes 10–15 mm. long, lanceolate, acute or acuminate; petals obovate, abruptly acuminate, 2–4 cm. long, golden-yellow with a vermillion base; stamens numerous, 2–3 cm. long, filaments mostly filiform, a few of the outer series somewhat dilated at base; capsule linear-clavate, elongated, 2.5–5.5 cm. long, somewhat thickened toward the apex, hirsute; seeds numerous, irregularly angular, minutely tuberculate.

Distribution: desert mesas, canyon slopes of southern California.

Specimens examined:

CALIFORNIA: Lone Tree Valley, June 1862, *Brewer 1225* (US); Cedar Mountain, Alameda Co., May 1903, *Elmer 4354* (CAS, M, P, US); Tulare Co., 21 July 1904, *Culbertson 4306* (P); Mount Hamilton, Santa Clara Co., 31 May 1907, *Heller 8616* (ANSP, F, M, US); Sierra Nevada Co., 1911, *Peirson 750* (PH); Pine Valley, San Diego Co., 10 May 1920, *Spencer 1815* (P); Alameda Ridge, Santa Clara Co., 18 April 1926, *Howell 1900* (CAS); near Gardenville, Humboldt Co., 16 June 1931, *Howell 6715* (CAS).

SECTION IV. BICUSPIDARIA Brewer & Watson

Section IV. BICUSPIDARIA Brewer & Watson in Bot. Calif. 1: 237. 1876; Urban & Gilg in Engl. & Prantl, Nat. Pflanzenfam. 3^{6a}: 111. 1894; in Nov. Act. Nat. Cur. [Abh. K. Leop.-Carol. Deutsch. Akad. Naturf.] 76: 78. 1900.

Annuals from a fusiform root; the stems, leaves, bracts, and capsules densely clothed with glochidiate and spine-like hairs; leaves sessile, sinuate-dentate, rarely pinnatifid; flowers subtended by bracts nearly concealing the calyx-tube; petals 5, yellow or orange; filaments numerous, apex dilated, cuspidate, the middle cusp bearing the anther, the two lateral cusps or lobes sterile; capsule cylindrical, attenuated, sessile; placentae broad; seeds 15–40, in 2 series, horizontal, irregularly gibbous-rugose, plicate, opaque, not winged. Spp. 59–61.

KEY TO THE SPECIES OF SECTION BICUSPIDARIA.

- A. Bracts ovate, white, scarious, membranaceous with deeply laciniate-toothed margins and midveins.
 - B. Petals 2–3 cm. long.....61. *M. involucrata*
 - BB. Petals 3.5–4.5 cm. long.....61a. *M. involucrata* var. *megalantha*
- AA. Bracts narrowed, green and leaf-like.
 - B. Flowers pedicellate.
 - C. Middle anther-bearing lobe of filament 2 mm. long.....60. *M. tricuspis*

- CC. Middle anther-bearing lobe of filament 0.5 mm. long.....
60a. *M. tricuspis* var. *brevicornuta*
- BB. Flowers sessile.
- C. Flowers yellow.
- D. Middle anther-bearing lobe of filament as long as or shorter than
 lateral lobes.....59. *M. hirsutissima*
- DD. Middle anther-bearing lobe of filament elongated, twice the length
 of lateral lobes.....59a. *M. hirsutissima* var. *stenophylla*
- CC. Flowers orange.....59b. *M. hirsutissima* var. *nesiotes*

59. *M. hirsutissima* Watson in Proc. Am. Acad. **12**: 252. 1877; Urban & Gilg in Nov. Act. Nat. Cur. [Abh. K. Leop.-Carol. Deutsch. Akad. Naturf.] **76**: 82. 1900; Johnston in Univ. Calif. Publ. Bot. **7**: 443. 1922; in Proc. Cal. Acad. Sci. **IV**. **12**: 1104. 1924.

Bicuspidaria hirsutissima (Wats.) Rydb. in Bull. Torr. Bot. Club **30**: 275. 1903.

Annual or biennial herbaceous plants, stout, erect with ascending branches; older stems and branches whitish and almost glabrous, the younger parts hirsute with short barbed, and long spreading spine-like hairs; leaves sessile, linear-lanceolate, acuminate, 3–8 cm. long, irregularly pinnatifid with divaricate acute segments and teeth, upper surface clothed with long spreading spine-like hairs, these appearing also along the prominent midvein below; subtending floral bracts acuminate, with narrow hirsute lobes; flowers terminal, axillary, sessile; calyx-tube somewhat concealed by floral bracts, 10–14 mm. long, longitudinally ridged, extremely hirsute with long stiff spreading spine-like hairs and short barbed pubescence; calyx-lobes 5, 16–20 mm. long, lanceolate, long-acuminate, strongly 1-nerved, with long scattered spine-like hairs, especially along the prominent nerve, and with shorter hairs on the margins, the margins revolute near the apex; petals yellow, acute, 3–3.5 cm. long, apex slightly barbellate; stamens numerous, 100–130, in 4–5 series, the filaments orange-colored toward the apex, shortly cuspidate, 10–12 mm. long, anthers oblong; style 14 mm. long; capsule oblong, 14–15 mm. long; seeds and mature fruit not seen.

Distribution: in Lower California and islands in the Gulf of California.

Specimens examined:

LOWER CALIFORNIA: Angel Island, Bay of California, coll. of 1876, *Dr. Street* (US cotype).

One specimen, apparently a part of the type collection, was seen which, however, had no mature seeds or fruit. Urban and Gilg described the fruit as a cylindrical capsule 1.8–2.1 cm. long and 6–7 mm. broad, somewhat attenuated, subchartaceous, brownish-green, scabrous, 20-nerved, the alternating nerves less conspicuous; the calyx-lobes blackish, shriveled, persistent, irregularly erect or slightly recurved; the seeds 30–40 on biseriate placentae, horizontal, irregularly oval or oblong, about 2 mm. long and 1.5 mm. broad, irregularly gibbous-rugose, plicated, gray or grayish-yellow, minutely granulated-punctate, not winged.

There is a tendency for the calyx-lobes to become pinnately divided as in the floral bract.

59a. *M. hirsutissima* Watson var. *stenophylla* (Urb. & Gilg) Johnston in Univ. Calif. Publ. Bot. 7: 443. 1922.

M. stenophylla Urban & Gilg in Nov. Act. Nat. Cur. [Abh. K. Leop.-Carol. Deutsch. Akad. Naturf.] 76: 80. 1900.

Middle lobe of the anther greatly elongated, twice the length of the lateral lobes.

Distribution: in southern California, and the northern third of Lower California.

Specimens examined:

CALIFORNIA: Mountain Springs, San Diego Co., 12 May 1894, *Schoenfeldt 3069* (US).

LOWER CALIFORNIA: San Quentin, 22 April 1886, *Orcutt 1357* (F, M); Cajon de Santa Maria, 14 May 1889, *Brandege* (C); Calamujuet, 10 May 1889, *Brandege* (ANSP, US); opposite Pond Island, Angel de la Guardia Island, 30 June 1921, *Johnston 4229* (CAS).

59b. *M. hirsutissima* Watson var. *nesiotes* Johnston in Univ. Calif. Publ. Bot. 7: 443–444. 1922.

Leaves thin, coarsely toothed; flowers orange-colored.

Distribution: on San Benito, Natividad, and Cedros Islands, Lower California.

Specimens examined:

LOWER CALIFORNIA: Los Angeles Bay, Gulf of California, 1887, *Palmer 591* (US); Cedros Island, 18–20 May 1889, *Palmer 712* (F, US); Cedros Island,

March-June 1897, *Anthony* 280 (C, F, M, US); Cedros Island, 1897, *Anthony* (US); San Benito Island, 28 March 1897, *Brandeggee* (C TYPE); Natividad Island, 10 April 1899, *Brandeggee* (C); San Bertolome Bay, 14 March 1911, *Rose* 16230 (US); Cedros Island, 12 March 1911, *Rose* 16152 (US).

60. *M. tricuspis* Gray in *Am. Nat.* 9: 271. 1875; Brewer & Watson, *Bot. Calif.* 1: 237. 1876; Watson in *Proc. Am. Acad.* 12: 252. 1877; Engl. & Prantl, *Nat. Pflanzenfam.* 3^{6a}: 111. 1895, and ed. 2. 21: 534. 1925; Urban & Gilg in *Nov. Act. Nat. Cur.* [Abh. K. Leop.-Carol. Deutsch. Akad. Naturf.] 76: 78-79. 1900; Johnston in *Univ. Calif. Publ. Bot.* 7: 444. 1922; Tidestrom in *Contr. U. S. Nat. Herb.* [Fl. Utah & Nev.] 25: 361, 363. 1925; Jepson, *Man. Fl. Pl. Calif.* 649. 1925.

Bicuspidaria tricuspis (Gray) Rydb. in *Bull. Torr. Bot. Club* 30: 275. 1903.

Acrolasia tricuspis (Gray) Davidson in *Bull. So. Calif. Acad. Sci.* 9: 71. 1910.

Annual herbaceous plants, scabrous, from a slender tap-root, diffusely branched from the base, 0.5-2.4 dm. high; stems erect or spreading, yellowish-white, striate, densely hispid with short verticillate glochidiate and scattered longer spine-like hairs, the older parts of the stem sometimes becoming almost smooth; leaves alternate, linear-lanceolate to ovate-lanceolate, 2-7 cm. long, subentire to deeply sinuate-dentate, acute at the apex, subsessile or attenuated at the base into a short petiole, upper surface with glochidiate and a few spine-like hairs, especially on the leaf margins, lower surface densely hispid with glochidiate spine-like hairs scattered along the midvein; flowers terminal, short-pedicellate, solitary, yellow, subtended by small foliaceous bracts; bracts linear-lanceolate, coarsely sinuate-dentate or pinnatifid, long-attenuated at the apex, not concealing the calyx-tube; calyx-tube cylindric or turbinate, obtuse at the base, 10-15 mm. long, short-pedicelled, light brown, often mottled, densely hirsute; calyx-lobes lanceolate-subulate, erect before anthesis, later becoming reflexed, long-acuminate, 10-13 mm. long, lighter in color than the calyx-tube, pubescent; petals spathulate-obovate, apiculate, 2-2.5 cm. long, narrowed or unguiculate at the base, minutely pilose at the apex, otherwise glabrous; stamens 80-100, in 4 series, the inner reflexed

and the outer erect, linear, 8-9 mm. long, slightly dilated toward the cuspidate apex, the lateral cusps sterile and twice the length of the middle cusps bearing the oblong-linear anther; style 3-cleft, angled or subterete, apex densely papillose; capsule cylindric, reflexed at apex of short pedicel, crowned by the persistent reflexed calyx-lobes and withered style; seeds numerous, in 2 series on each placenta, irregularly oblong to oblong-oval, strongly rugose, grayish-green, minutely granulate-punctate, not winged.

Distribution: desert areas and dry hillsides and canyons in southern Utah and Nevada, westward to the Mohave and Colorado Deserts, south to western Arizona.

Specimens examined:

UTAH: southern Utah, 1877, *Palmer 173* (US).

NEVADA: Vegas Wash, Lincoln Co., 350 m. alt., 2 May 1891, *Bailey 1892* (US); St. Joe, May 1894, *Jones 5029ak* (P); Eldorado Canyon, Lincoln Co., Jan.-April 1895, *Mills 8* (US); Moapa, 1400 ft. alt., 27 April 1904, *Jones* (P); Moapa, 8 April 1905, *Goodding 2180* (C, M, RM); Overton, Clark Co., 1500 ft. alt., 8 June 1912, *Heller 10440* (US); south of St. Thomas, 480 m. alt., 25 April 1919, *Tidestrom 9141* (US).

ARIZONA: Yucca, 17 May 1884, *Jones* (P); Franconia, 900 ft. alt., 17 April 1903, *Jones* (P).

CALIFORNIA: Fort Mohave, 18 Feb. 1861, *Cooper* (US); Whitewater, Colorado Desert, April 1876, *Lemmon 258* (C); The Needles, 5 May 1884, *Jones 3824* (C, CAS, F, P, RM, US); gravelly washes, Needles, 500 ft. alt., 1 April 1920, *Munz & Harwood 3639* (P, RM, US p. p.).

60a. *M. tricuspis* Gray var. *brevicornuta* Johnston in Univ. Calif. Publ. Bot. 7: 444. 1922.

Acrolasia tridentata Davidson in Bull. So. Calif. Acad. Sci. 9: 71. 1910.

Lateral lobes of the filament short, oblong, about 0.5 mm. long.

Distribution: in the Mohave and Colorado Deserts, representing the western limit of distribution of the species.

Specimens examined:

CALIFORNIA: Daggett, San Bernardino Co., *Brandege* (C); Mohave Desert, May 1881, *Parish* (US); southern base of Calico Mts., 22 April 1915, *Shreve* (A); 10 miles north of Barstow, 14 May 1922, *Johnston 6526* (P); Newberry Mts., 7 miles east of Daggett, San Bernardino Co., 6 April 1924, *Munz & Keck 7847* (P); foot of Mountain Springs Grande, Imperial Co., 16 April 1927, *Peirson 7209* (PH); mud hills near Red Rock Canyon, northwest of Mohave Desert, Kern Co., 13 May 1930, *Howell 4947* (CAS).

61. *M. involucrata* Watson in Proc. Am. Acad. **20**: 367. 1885; Urban & Gilg in Nov. Act. Nat. Cur. [Abh. K. Leop.-Carol. Deutsch. Akad. Naturf.] **76**: 83. 1900; Johnston in Univ. Calif. Publ. Bot. **7**: 443. 1922; Tidestrom in Contr. U. S. Nat. Herb. [Fl. Utah & Nev.] **25**: 361. 1925; Jepson, Man. Fl. Pl. Calif. 649. 1925.

Bicuspidaria involucrata (Wats.) Rydb. in Bull. Torr. Bot. Club **30**: 275. 1903.

Annual herbaceous plants, hispid, branching from base, rarely simple, 1–3 dm. high; stems stout, erect, with white, longitudinally striated epidermis, densely pubescent, especially upper branches, with short verticillate glochidiate, and a few scattered long spine-like hairs; leaves alternate, linear to oblong-lanceolate, acute or slightly obtuse at the apex, 4–12 cm. long, coarsely sinuate-dentate, lower leaves attenuated into a short petiole, upper sessile, mostly cordate-amplexicaul at base, upper surface of leaves clothed with short spine-like hairs, lower surface, the prominent midvein, and margins densely hispid with verticillate glochidiate and some long spine-like hairs; flowers terminal, solitary, sessile, pale yellow, subtended by a pair of broadly ovate bracts; bracts acute or acuminate, white, scarious, sessile, subcordate-amplexicaul, with deeply laciniate-toothed green margins and midveins covered with short glochidiate and long stout spine-like hairs; calyx-tube subcylindrical, obtuse at the base, 15–30 mm. long, conspicuously 10-nerved, hispid with verticillate glochidiate and spine-like hairs, concealed by the subtending bracts; calyx-lobes long-acuminate, shorter than the calyx-tube, margins revolute, the prominent midvein with short glochidiate and long spine-like hairs; petals 5, obovate to oblanceolate, triangularly apiculate at the apex, base narrowed and unguiculate, 2–3 cm. long, sparsely pilose; stamens numerous, in 4–5 series, inner inflexed, outer erect, the 5 filaments opposite the sepals 3-nerved, remainder 1-nerved, linear, dilated toward apex, bicuspidate with long linear cusps, anther oblong; style tubular, 3 flattened stigmatic lobes at apex; capsule subcylindrical, slightly attenuated to an obtuse base, 1.5–2.5 cm. long, brownish-black, scabrous, papery, 20-nerved, the alternating nerves

less conspicuous, crowned with persistent withered style and the irregular erect calyx-lobes; seeds 15–40, in 1 or 2 rows on each placenta, horizontally flattened, not margined, irregularly oval to quadrangularly-rotund, gibbous-rugose, gray or yellowish-gray, 3–3.5 mm. long, minutely and densely granulate-tuberculate.

Distribution: in desert areas and on dry hillsides of western Arizona, north and westward to the Colorado and Mohave Deserts, and south to Sonora, Mexico.

Specimens examined:

ARIZONA: Yucca, 15 May 1884, *Jones* (P); Valley of the Hassayampa, April 1876, *Palmer 598* (C, M, US cotype); Chemehuevis, 4500 ft. alt., 1 April 1903, *Jones* (P); Agua Caliente, 27 Feb. 1914, *Carlson* (CAS); hills near Evans, road from Coariz to Parker, 28 April 1915, *Shreve* (A); Gila Mts., Yuma Co., 4 March 1927, *Harrison 3601* (US); near Dome, Yuma Co., 10 March 1928, *Peebles & Harrison 5049* (US).

CALIFORNIA: Colorado Desert, dry gravelly hill slopes, Nov.–Dec. 1852, *Schott 1* (F); mountains, Riverside, 25 Jan. 1858, *Newberry* (US); Mohave River district, San Bernardino Co., 1876, *Parry & Lemmon 138* (US TYPE—also specimen of var. *megalantha*); Whitewater, Colorado Desert, 1881, *Parry 210* (M); The Needles, 8 May 1884, *Jones 3855a* (US); Borregos Springs, 18 April 1895, *Brandeggee* (C); Shepherd's Canyon, 4600 ft. alt., 30 April 1897, *Jones* (P, US); San Felipe, May–Oct. 1898, *Purpus* (ANSP, C, RM); sandy soil, Signal Mountain, San Diego Co., 2 April 1903, *Abrams 3166* (M, P); Colorado Desert, April 1905, *Brandeggee* (US); Kelso, 3000 ft. alt., 2 May 1906, *Jones* (P); River Mountain, Colorado River, 18 March 1910, *Grinnell* (C); San Felipe Creek, Colorado Desert, San Diego Co., 14 April 1913, *Eastwood 2712* (CAS, M, US); Needles, gravelly wash, 500 ft. alt., 1 April 1920, *Munz & Harwood 3639* (US); Palm Springs, Colorado Desert, 400 ft. alt., 12 April 1922, *Spencer 1143* (P); near Palm Wash, Colorado Desert, San Diego Co., 24 March 1928, *Howell 3510* (CAS).

MEXICO: Port Lobos, Sonora, 28 March 1884, *Pringle* (F, US); near Libertad, Sonora, 21 March 1926, *Shreve 5848* (US); hill north of Libertad Bay Inn, Sonora, 21 March 1926, *Long 45* (A, US).

61a. *M. involucrata* Wats. var. *megalantha* Johnston in Univ. Calif. Publ. Bot. 7: 443. 1922.

Petals 3.5–4.5 cm. long.

Distribution: in the Colorado Desert, California.

Specimens examined:

CALIFORNIA: Colorado Desert, *Parish* (C); Santa Maria Mts., Colorado Desert, *Schellenger 1* (P); Whitewater, Colorado Desert, April 1876, *Lemmon 258* (F); Whitewater, 1880, *Parish & Parish 210* (ANSP, F); in semi-arid land, Whitewater, 19 April 1913, *Piemeisel 3481* (US); Painted Canyon, near Mecca, 30 March 1921, *Evans* (P); near Mecca, Colorado Desert, 160 ft. alt., 29 March 1922, *Spen-*

cer 1900 (M, P); Cottonwood Springs, Riverside Co., 12 April 1924, *Evermann* (CAS, M); Westmoreland, Imperial Co., March 1926, *Anderson* (CAS); Coachella Valley, Colorado Desert, Riverside Co., 29 March 1927, *Stason* (CAS).

The variety *megalantha* differs from the typical species only in the larger more conspicuous flowers of brighter yellow. Watson, in describing the species *involucrata*, had before him a small-flowered specimen with petals about one inch in length, which became the typical form. Both the species and variety have the characteristic large white green-margined floral bracts. The variety is confined in its distribution to the Colorado Desert, whereas the species, though most common in the Colorado Desert, extends eastward into Arizona and southward into Sonora.

SPECIES EXCLUDED.

Mentzelia cordata Kellogg in Proc. Cal. Acad. 2: 33. 1863 = **Eucnide cordata** Kellogg.

Mentzelia gronoviaefolia Fisch. & Mey. Ind. Sem. Hort. Petrop. 10: 54. 1845 = **Eucnide bartonioides** Zucc.

Mentzelia lobata Walp. Rep. 2: 224. 1843 = **Eucnide lobata** Gray.

Mentzelia synandra Nels. in Bot. Gaz. 47: 428. 1909 = **Eucnide urens** Parry.

Mentzelia urens Parry ex Gray in Proc. Am. Acad. 10: 71. 1874 = **Eucnide urens** Parry.

Mentzelia urens Vell. Fl. Flum. 5: pl. 97. 1825 = **Loasa parviflora** Schrad.

DOUBTFUL SPECIES.

Acrolasia elata Phil. in Anal. Univ. Chile 85: 5. 1894. Chile.

Acrolasia ngaumderensis Guerke in Bauer, Deutsch. Niger-Bunue Exped. 163. Africa.

Mentzelia corumbaensis Hoehne in Comm. Linh. Telegr. Matto Grosso Amaz. Anexo 5, Bot. 6: 54, pl. 126. 1915. Brazil.

Mentzelia fragilis Huber in Bull. Herb. Boiss. II. 1: 314. 1901. Brazil.

Mentzelia grandiflora Ruiz & Pav. ex Don, Hist. Dichl. Pl. 3: 66. 1834. Peru.

Mentzelia hirta Pav. ex Don, Hist. Dichl. Pl. 3: 66. 1834. Mexico.

Mentzelia ovata Thomps. in Asa Gray Bull. 7: 37. 1894 [as *orata*]; abstract in Just's Bot. Jahresb. 23²: 90. 1897, *nomen nudum*.

Mentzelia propinqua Aresch. in Freg. Eugenies Resa, Bot. 133. 1910. Ecuador.

LIST OF EXSICCATAE

The collector's numbers are indicated by *italics*, the collections without numbers are indicated by a dash. The numbers in parentheses refer to the species number used in this monograph.

- Abrams, L. R. 872 2686, 9502 (22); 3589 (51b); 1850 (52a); 2580 (53a); 3477 (55); 9545 (56); 3166 (61).
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- Gurney, J. — (21).
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<i>Catalinensis</i>	190	<i>superba</i>	140
<i>compacta</i>	197	<i>Wrightii</i>	160
<i>congesta</i>	188	Bicuspidaria (section)	200
<i>ctenophora</i>	184	<i>Bicuspidaria</i>	112
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<i>desertorum</i>	194	<i>involuta</i>	205
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<i>albicaulis</i> var. <i>gracilis</i>	184	<i>gracilenta</i> var. <i>Veatchiana</i>	186
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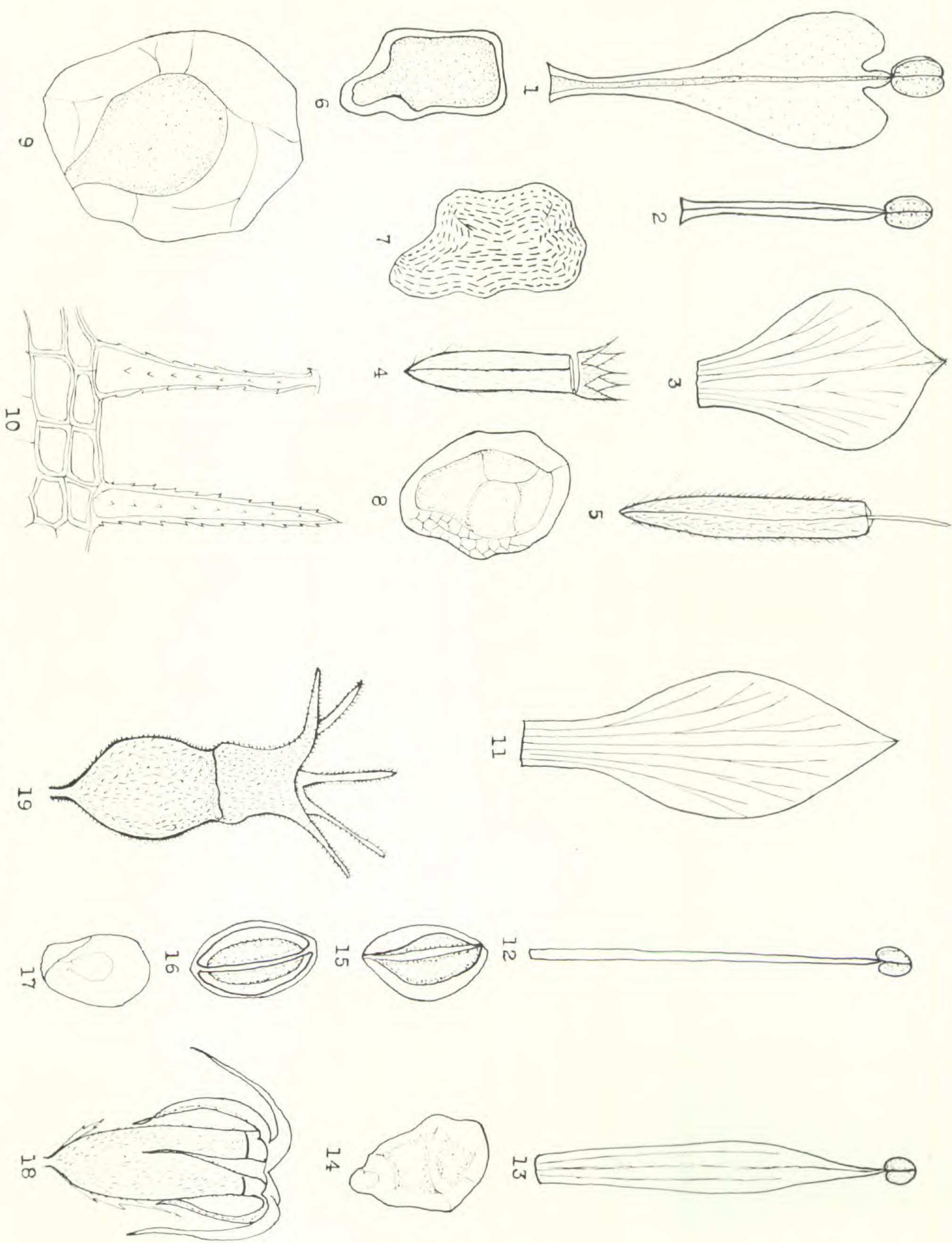
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EXPLANATION OF PLATE

PLATE 4

- Fig. 1. Outer petaloid stamen of *Mentzelia aspera*. $\times 7\frac{1}{2}$.
Fig. 2. Inner stamen of *Mentzelia aspera*. $\times 7\frac{1}{2}$.
Fig. 3. Petal of *Mentzelia aspera*. $\times 3$.
Fig. 4. Capsule of *Mentzelia aspera*, showing calyx-lobes breaking away from the calyx. $\times 1\frac{1}{2}$.
Fig. 5. Capsule of *Mentzelia aspera*. $\times 3$.
Fig. 6. Embryo and surrounding endosperm of *Mentzelia aspera*. $\times 7\frac{1}{2}$.
Fig. 7. Seed of *Mentzelia aspera*. $\times 3$.
Fig. 8. Seed of *Mentzelia adhaerens*. $\times 7\frac{1}{2}$.
Fig. 9. Seed of *Mentzelia arborescens*. $\times 7\frac{1}{2}$.
Fig. 10. Epidermal hairs of *Mentzelia asperula* (camera-lucida drawing).
Fig. 11. Petal of *Mentzelia albicaulis*. $\times 1$.
Fig. 12. Inner stamen of *Mentzelia laevicaulis*. $\times 1$.
Fig. 13. Outer stamen of *Mentzelia laevicaulis*. $\times 1$.
Fig. 14. Seed of *Mentzelia reflexa*. $\times 7\frac{1}{2}$.
Fig. 15. Seed of *Mentzelia Torreyi*. $\times 7\frac{1}{2}$.
Fig. 16. Seed of *Mentzelia Torreyi*. $\times 7\frac{1}{2}$.
Fig. 17. Seed of *Mentzelia laevicaulis*. $\times 7\frac{1}{2}$.
Fig. 18. Capsule of *Mentzelia laevicaulis*. $\times \frac{2}{3}$.
Fig. 19. Capsule of *Mentzelia Torreyi*. $\times 3$.

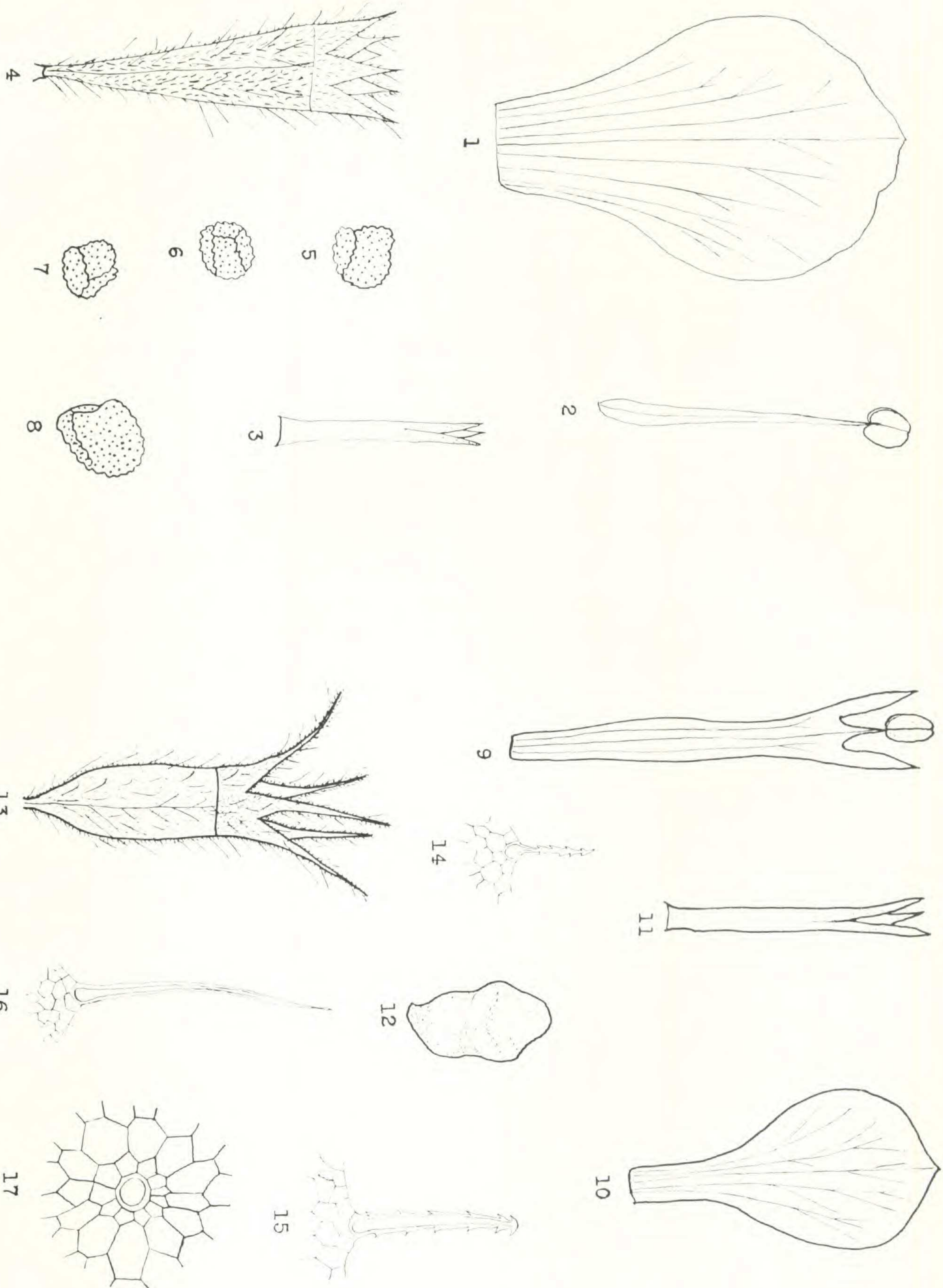


DARLINGTON—MONOGRAPH OF MENTZELIA

EXPLANATION OF PLATE

PLATE 5

- Fig. 1. Petal of *Mentzelia albicaulis*. $\times 7\frac{1}{2}$.
Fig. 2. Stamen of *Mentzelia albicaulis*. $\times 7\frac{1}{2}$.
Fig. 3. Showing stigmatic surfaces of the style of *Mentzelia albicaulis*. $\times 7\frac{1}{2}$.
Fig. 4. Capsule of *Mentzelia albicaulis*. $\times 3$.
Figs. 5-8. Seeds of *Mentzelia albicaulis* from different angles. $\times 7\frac{1}{2}$.
Fig. 9. Stamen showing bicuspidate apex of *Mentzelia tricuspis*. $\times 7\frac{1}{2}$.
Fig. 10. Petal of *Mentzelia tricuspis*. $\times 2$.
Fig. 11. Style showing stigmatic surfaces of *Mentzelia tricuspis*. $\times 2$.
Fig. 12. Seed of *Mentzelia tricuspis*. $\times 3$.
Fig. 13. Capsule of *Mentzelia tricuspis*. $\times 1\frac{1}{2}$.
Figs. 14-16. Showing pubescence of *Mentzelia tricuspis* (camera-lucida drawing).
Fig. 17. Epidermal surface showing cellular structure at base of hair of *Mentzelia tricuspis* (camera-lucida drawing).



DARLINGTON—MONOGRAPH OF MENTZELIA

EXPLANATION OF PLATE

PLATE 6

Fig. 1. *Mentzelia longiloba* Darlington. From specimen, *M. E. Jones*, in the Herbarium of Pomona College.

Fig. 2. *Mentzelia oreophila* Darlington. From the type specimen, *M. E. Jones*, in the Missouri Botanical Garden Herbarium.



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